CAS integration tests regression report
Giac 1.9.0-11 via sagemath 9.6 vs. Giac 1.7.0 via sagemath 9.3

Nasser M. Abbasi

September 22, 2022 Compiled on September 22, 2022 at 3:53am

Contents

1 Summary of regression test table

Table 1: Summary table of regression tests

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
1	10	532	0 (not solved)	1 (pass)
2	13	881	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
3	13	882	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
4	13	889	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
5	13	890	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
6	13	914	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
7	13	915	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
8	13	916	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
9	13	920	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
10	13	921	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
11	13	922	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
12	14	1005	0 (not solved)	1 (pass)
13	20	224	0 (not solved)	1 (pass)
14	20	231	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
15	25	1735	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
16	25	1738	0 (not solved)	1 (pass)
17	25	1739	0 (not solved)	1 (pass)
18	25	1740	0 (not solved)	1 (pass)
19	25	1741	0 (not solved)	1 (pass)
20	25	1748	0 (not solved)	1 (pass)
21	25	1750	0 (not solved)	1 (pass)
22	25	1751	0 (not solved)	1 (pass)
23	25	2991	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
24	25	2992	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
25	26	245	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
26	26	246	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
27	26	249	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
28	26	252	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
29	26	256	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
30	26	257	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
31	26	258	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
32	26	263	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
33	26	264	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
34	27	1054	0 (not solved)	1 (pass)
35	33	841	0 (not solved)	1 (pass)
36	33	853	0 (not solved)	1 (pass)
37	33	854	0 (not solved)	1 (pass)
38	33	1957	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
39	33	1958	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
40	33	1966	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
41	33	1967	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
42	33	1968	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
43	33	1969	0 (not solved)	1 (pass)
44	34	1179	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
45	34	2225	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0,sageV`	1 (pass)
46	34	2227	0 (not solved)	1 (pass)
47	35	18	0 (not solved)	1 (pass)
48	35	19	0 (not solved)	1 (pass)
49	35	20	0 (not solved)	1 (pass)
50	35	21	0 (not solved)	1 (pass)
51	35	22	0 (not solved)	1 (pass)
52	35	23	0 (not solved)	1 (pass)
53	35	24	0 (not solved)	1 (pass)
54	35	25	0 (not solved)	1 (pass)
55	35	26	0 (not solved)	1 (pass)
56	35	27	0 (not solved)	1 (pass)
57	35	28	0 (not solved)	1 (pass)
58	35	29	0 (not solved)	1 (pass)
59	35	30	0 (not solved)	1 (pass)
60	35	31	0 (not solved)	1 (pass)
61	35	44	0 (not solved)	1 (pass)
62	35	45	0 (not solved)	1 (pass)
63	35	46	0 (not solved)	1 (pass)
64	35	47	0 (not solved)	1 (pass)
65	35	48	0 (not solved)	1 (pass)
66	35	49	0 (not solved)	1 (pass)
67	35	50	0 (not solved)	1 (pass)
68	35	51	0 (not solved)	1 (pass)
69	35	52	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
70	35	53	0 (not solved)	1 (pass)
71	35	130	0 (not solved)	1 (pass)
72	35	134	0 (not solved)	1 (pass)
73	35	586	-1 (time out)	1 (pass)
74	35	842	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
75	39	3	0 (not solved)	1 (pass)
76	39	4	0 (not solved)	1 (pass)
77	51	163	0 (not solved)	1 (pass)
78	55	744	0 (not solved)	1 (pass)
79	59	201	-1 (time out)	1 (pass)
80	59	263	-1 (time out)	1 (pass)
81	59	295	-1 (time out)	1 (pass)
82	61	27	-1 (time out)	1 (pass)
83	64	111	-2 (exception) `Exception raised: NotImplementedError >> Unable to parse Giac output: 2*(2*sqrt(2)*atan(4*sqrt(sageV`	1 (pass)
84	64	185	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
85	65	190	0 (not solved)	1 (pass)
86	65	191	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
87	65	192	0 (not solved)	1 (pass)
88	65	193	0 (not solved)	1 (pass)
89	65	206	0 (not solved)	1 (pass)
90	65	207	0 (not solved)	1 (pass)
91	65	208	0 (not solved)	1 (pass)
92	65	209	0 (not solved)	1 (pass)
93	65	210	0 (not solved)	1 (pass)
94	65	228	0 (not solved)	1 (pass)
95	65	229	0 (not solved)	1 (pass)
96	65	230	0 (not solved)	1 (pass)
97	65	231	0 (not solved)	1 (pass)
98	65	249	0 (not solved)	1 (pass)
99	65	250	0 (not solved)	1 (pass)
100	65	251	0 (not solved)	1 (pass)
101	70	164	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
102	70	517	-1 (time out)	1 (pass)
103	70	518	-1 (time out)	1 (pass)
104	70	528	-1 (time out)	1 (pass)
105	70	529	0 (not solved)	1 (pass)
106	74	468	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
107	74	469	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
108	74	470	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
109	74	471	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
110	79	499	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
111	79	558	-1 (time out)	1 (pass)
112	89	128	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
113	89	129	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
114	89	130	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
115	89	144	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
116	92	107	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
117	92	108	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
118	92	109	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
119	92	110	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
120	92	113	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
121	94	107	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
122	94	109	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
123	94	111	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
124	94	112	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
125	94	113	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
126	94	281	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
127	94	410	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
128	94	411	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
129	94	412	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
130	94	413	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
131	95	68	0 (not solved)	1 (pass)
132	98	52	0 (not solved)	1 (pass)
133	103	1137	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
134	103	1138	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
135	103	1143	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
136	103	1144	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
137	103	1149	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
138	103	1150	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
139	103	1155	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
140	103	1156	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
141	103	1161	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
142	103	1162	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
143	103	1167	-1 (time out)	1 (pass)
144	103	1168	-1 (time out)	1 (pass)
145	141	421	0 (not solved)	1 (pass)
146	141	422	-1 (time out)	1 (pass)
147	141	428	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
148	141	429	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
149	141	669	0 (not solved)	1 (pass)
150	141	734	0 (not solved)	1 (pass)
151	141	740	0 (not solved)	1 (pass)
152	149	24	0 (not solved)	1 (pass)
153	153	20	0 (not solved)	1 (pass)
154	153	26	0 (not solved)	1 (pass)
155	164	437	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
156	164	438	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
157	164	439	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
158	164	442	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
159	164	443	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
160	164	447	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
161	164	448	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
162	164	449	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
163	164	452	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
164	164	455	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
165	164	456	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
166	164	486	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage3:=type(sage2) :;OU`	1 (pass)
167	164	491	-2 (exception) `Exception raised: RuntimeError >> An error occurred running a Giac command:INPUT:sage2OUTPUT :Evaluat`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
168	169	47	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
169	173	26	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
170	173	28	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
171	173	29	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
172	173	31	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
173	173	34	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
174	173	36	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
175	173	37	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
176	173	39	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
177	173	42	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
178	173	44	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
179	173	45	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
180	173	47	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
181	173	106	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
182	173	108	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
183	173	109	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
184	173	111	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
185	173	113	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
186	173	115	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
187	173	117	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
188	173	118	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
189	173	120	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
190	173	122	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
191	173	124	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
192	173	126	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
193	173	127	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
194	173	129	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
195	173	131	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
196	173	133	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
197	176	27	0 (not solved)	1 (pass)
198	180	144	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
199	180	148	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
200	180	150	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
201	180	152	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
202	180	154	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
203	180	156	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
204	180	159	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
205	180	161	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
206	180	163	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
207	180	165	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
208	180	167	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
209	196	549	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
210	196	550	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
211	196	551	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
212	196	552	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
213	196	553	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
214	196	728	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
215	196	729	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
216	196	730	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
217	196	731	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
218	197	5	-1 (time out)	1 (pass)
219	197	6	-1 (time out)	1 (pass)
220	197	7	-1 (time out)	1 (pass)
221	197	8	-1 (time out)	1 (pass)
222	197	24	0 (not solved)	1 (pass)
223	199	2	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
224	199	18	0 (not solved)	1 (pass)
225	199	19	0 (not solved)	1 (pass)
226	199	20	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
227	199	21	0 (not solved)	1 (pass)
228	199	22	0 (not solved)	1 (pass)
229	199	23	0 (not solved)	1 (pass)
230	199	24	0 (not solved)	1 (pass)
231	199	128	0 (not solved)	1 (pass)
232	199	162	0 (not solved)	1 (pass)
233	199	227	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
234	199	229	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
235	199	244	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
236	199	246	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
237	199	247	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
238	199	296	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
239	199	310	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
240	199	312	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
241	199	313	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
242	199	314	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
243	199	315	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
244	199	316	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
245	199	317	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
246	199	318	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
247	199	383	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
248	199	384	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
249	199	386	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
250	199	402	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
251	199	475	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
252	199	476	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
253	199	477	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
254	199	478	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
255	199	479	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
256	199	560	0 (not solved)	1 (pass)
257	199	561	0 (not solved)	1 (pass)
258	199	562	0 (not solved)	1 (pass)
259	199	563	0 (not solved)	1 (pass)
260	199	579	0 (not solved)	1 (pass)
261	199	580	0 (not solved)	1 (pass)
262	199	776	0 (not solved)	1 (pass)
263	199	777	0 (not solved)	1 (pass)
264	199	778	0 (not solved)	1 (pass)
265	199	779	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
266	199	793	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
267	199	795	0 (not solved)	1 (pass)
268	199	796	0 (not solved)	1 (pass)
269	201	71	0 (not solved)	1 (pass)
270	201	82	0 (not solved)	1 (pass)
271	204	46	0 (not solved)	1 (pass)
272	204	149	0 (not solved)	1 (pass)
273	206	70	0 (not solved)	1 (pass)
274	206	71	0 (not solved)	1 (pass)
275	206	72	0 (not solved)	1 (pass)
276	206	73	0 (not solved)	1 (pass)
277	206	75	0 (not solved)	1 (pass)
278	206	76	0 (not solved)	1 (pass)
279	206	78	0 (not solved)	1 (pass)
280	206	79	0 (not solved)	1 (pass)
281	206	80	0 (not solved)	1 (pass)
282	206	81	0 (not solved)	1 (pass)
283	206	86	0 (not solved)	1 (pass)
284	206	87	0 (not solved)	1 (pass)
285	206	88	0 (not solved)	1 (pass)
286	206	89	0 (not solved)	1 (pass)
287	206	91	0 (not solved)	1 (pass)
288	206	92	0 (not solved)	1 (pass)
289	206	103	0 (not solved)	1 (pass)
290	206	110	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
291	206	111	0 (not solved)	1 (pass)
292	206	112	0 (not solved)	1 (pass)
293	206	113	0 (not solved)	1 (pass)
294	206	117	0 (not solved)	1 (pass)
295	206	118	0 (not solved)	1 (pass)
296	206	119	0 (not solved)	1 (pass)
297	206	120	0 (not solved)	1 (pass)
298	206	121	0 (not solved)	1 (pass)
299	206	122	0 (not solved)	1 (pass)
300	206	123	0 (not solved)	1 (pass)
301	206	124	0 (not solved)	1 (pass)
302	206	125	0 (not solved)	1 (pass)
303	206	127	0 (not solved)	1 (pass)
304	206	128	0 (not solved)	1 (pass)
305	206	129	0 (not solved)	1 (pass)
306	206	132	0 (not solved)	1 (pass)
307	206	135	0 (not solved)	1 (pass)
308	209	403	0 (not solved)	1 (pass)
309	209	1081	-2 (exception) `Exception raised: NotImplementedError >> Unable to parse Giac output: (-atan(i)+ln(4*sqrt(2)))*sign(`	1 (pass)
310	209	1123	0 (not solved)	1 (pass)
311	209	1648	0 (not solved)	1 (pass)
312	210	42	0 (not solved)	1 (pass)
313	210	214	0 (not solved)	1 (pass)
314	210	529	0 (not solved)	1 (pass)
315	210	756	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
316	210	819	-1 (time out)	1 (pass)
317	210	856	0 (not solved)	1 (pass)
318	210	1147	0 (not solved)	1 (pass)
319	210	1197	0 (not solved)	1 (pass)
320	210	1569	0 (not solved)	1 (pass)
321	210	1596	0 (not solved)	1 (pass)
322	210	1763	-1 (time out)	1 (pass)
323	210	1809	0 (not solved)	1 (pass)
324	210	1860	0 (not solved)	1 (pass)
325	210	1905	0 (not solved)	1 (pass)
326	210	1996	-1 (time out)	1 (pass)
327	210	2050	-2 (exception) `Exception raised: NotImplementedError >> Unable to parse Giac output: Undef/Unsigned Inf encountered`	1 (pass)
328	210	2306	-1 (time out)	1 (pass)
329	210	2370	0 (not solved)	1 (pass)
330	210	2446	0 (not solved)	1 (pass)
331	210	2680	-1 (time out)	1 (pass)
332	210	2802	0 (not solved)	1 (pass)
333	210	2888	0 (not solved)	1 (pass)
334	210	2912	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
335	210	2955	0 (not solved)	1 (pass)
336	210	3083	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
337	210	3165	0 (not solved)	1 (pass)
338	210	3683	0 (not solved)	1 (pass)
339	210	3722	0 (not solved)	1 (pass)
340	210	3788	0 (not solved)	1 (pass)
341	210	3922	0 (not solved)	1 (pass)
342	210	4171	0 (not solved)	1 (pass)
343	210	4209	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
344	210	4323	0 (not solved)	1 (pass)
345	210	4476	0 (not solved)	1 (pass)
346	210	5416	0 (not solved)	1 (pass)
347	210	5600	0 (not solved)	1 (pass)
348	210	5649	0 (not solved)	1 (pass)
349	210	5811	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0, sageV`	1 (pass)
350	210	5911	0 (not solved)	1 (pass)
351	210	5947	0 (not solved)	1 (pass)
352	210	6013	0 (not solved)	1 (pass)
353	210	6096	0 (not solved)	1 (pass)
354	210	6201	0 (not solved)	1 (pass)
355	210	6696	0 (not solved)	1 (pass)
356	210	6926	0 (not solved)	1 (pass)
357	210	7043	0 (not solved)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
358	210	7194	-1 (time out)	1 (pass)
359	210	7444	0 (not solved)	1 (pass)
360	210	7495	0 (not solved)	1 (pass)
361	210	7627	0 (not solved)	1 (pass)
362	210	7683	0 (not solved)	1 (pass)
363	210	7755	-1 (time out)	1 (pass)
364	210	7789	0 (not solved)	1 (pass)
365	210	8043	0 (not solved)	1 (pass)
366	210	8143	-1 (time out)	1 (pass)
367	210	8742	0 (not solved)	1 (pass)
368	210	9011	0 (not solved)	1 (pass)
369	210	9031	0 (not solved)	1 (pass)
370	210	9135	0 (not solved)	1 (pass)
371	210	9215	0 (not solved)	1 (pass)
372	210	9254	0 (not solved)	1 (pass)
373	210	9330	0 (not solved)	1 (pass)
374	210	9649	0 (not solved)	1 (pass)
375	210	9667	-2 (exception) `Exception raised: TypeError >> An error occurred running a Giac command: INPUT:sage2:=int(sage0,sageV`	1 (pass)
376	210	9708	-2 (exception) `Exception raised: NotImplementedError >> Unable to parse Giac output: -(-2*ln(3)*exp(5)*exp(1)^21+6*`	1 (pass)
377	210	9784	0 (not solved)	1 (pass)
378	210	10096	-1 (time out)	1 (pass)

Continued on next page

Table 1 – continued from previous page

#	test file #	integral #	Giac 1.9.0-11 via sagemath 9.6	Giac 1.7.0 via sagemath 9.3
379	210	10193	0 (not solved)	1 (pass)

2 Test file number 10

Test folder name:

`test_cases/0_Independent_test_suites/10_Timofeev_Problems`

2.1 Problem number 532

$$\int \frac{e^{3x/4}}{\left(-2+e^{3x/4}\right)\sqrt{-2+e^{3x/4}+e^{3x/2}}}\,dx$$

Optimal antiderivative

$$\frac{2\operatorname{arctanh}\left(\frac{2-5\,\mathrm{e}^{\frac{3x}{4}}}{4\sqrt{-2+\mathrm{e}^{\frac{3x}{4}}+\mathrm{e}^{\frac{3x}{2}}}}\right)}{3}$$

command

```
integrate(exp(3/4*x)/(-2+exp(3/4*x))/(-2+exp(3/4*x)+exp(3/2*x))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2}{3}\log\left(\left|\sqrt{e^{\left(\frac{3}{2}x\right)}+e^{\left(\frac{3}{4}x\right)}-2}-e^{\left(\frac{3}{4}x\right)}+4\right|\right)+\frac{2}{3}\log\left(\left|\sqrt{e^{\left(\frac{3}{2}x\right)}+e^{\left(\frac{3}{4}x\right)}-2}-e^{\left(\frac{3}{4}x\right)}\right|\right)$$

3 Test file number 13

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.1_Linear/13_1.1.1.2-a+b_x-^m-c+d_x-^n`

3.1 Problem number 881

$$\int \frac{1}{\sqrt{cx^2}\,(a+bx)}\,dx$$

Optimal antiderivative

$$\frac{x\ln(x)}{a\sqrt{c\,x^2}}-\frac{x\ln(bx+a)}{a\sqrt{c\,x^2}}$$

command

```
integrate(1/(b*x+a)/(c*x^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\log\left(\left|-\left(\sqrt{c}\,x-\sqrt{cx^2}\right)b-2\,a\sqrt{c}\,\right|\right)}{a\sqrt{c}}-\frac{\log\left(\left|-\sqrt{c}\,x+\sqrt{cx^2}\,\right|\right)}{a\sqrt{c}}$$

3.2 Problem number 882

$$\int\frac{1}{x\sqrt{cx^2}\,(a+bx)}\,dx$$

Optimal antiderivative

$$-\frac{1}{a\sqrt{c\,x^2}}-\frac{bx\ln(x)}{a^2\sqrt{c\,x^2}}+\frac{bx\ln(bx+a)}{a^2\sqrt{c\,x^2}}$$

command

```
integrate(1/x/(b*x+a)/(c*x^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\sqrt{c}\left(\frac{b\log\left(\left|-\left(\sqrt{c}\,x-\sqrt{cx^2}\right)b-2\,a\sqrt{c}\,\right|\right)}{a^2c}-\frac{b\log\left(\left|-\sqrt{c}\,x+\sqrt{cx^2}\,\right|\right)}{a^2c}-\frac{2}{\left(\sqrt{c}\,x-\sqrt{cx^2}\right)a\sqrt{c}}\right)$$

3.3 Problem number 889

$$\int\frac{x^2}{(cx^2)^{3/2}\,(a+bx)}\,dx$$

Optimal antiderivative

$$\frac{x\ln(x)}{ac\sqrt{c\,x^2}}-\frac{x\ln(bx+a)}{ac\sqrt{c\,x^2}}$$

command

```
integrate(x^2/(c*x^2)^(3/2)/(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\frac{\log\left(\left|-\left(\sqrt{c}\,x-\sqrt{cx^2}\right)b-2\,a\sqrt{c}\right|\right)}{a\sqrt{c}}-\frac{\log\left(\left|-\sqrt{c}\,x+\sqrt{cx^2}\right|\right)}{a\sqrt{c}}}{c}$$

3.4 Problem number 890

$$\int \frac{x}{(cx^2)^{3/2}\,(a+bx)}\,dx$$

Optimal antiderivative

$$-\frac{1}{ac\sqrt{c\,x^2}}-\frac{bx\ln(x)}{a^2c\sqrt{c\,x^2}}+\frac{bx\ln(bx+a)}{a^2c\sqrt{c\,x^2}}$$

command

```
integrate(x/(c*x^2)^(3/2)/(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{b\log\left(\left|-\left(\sqrt{c}\,x-\sqrt{cx^2}\right)b-2\,a\sqrt{c}\right|\right)}{a^2c}-\frac{b\log\left(\left|-\sqrt{c}\,x+\sqrt{cx^2}\right|\right)}{a^2c}-\frac{2}{\left(\sqrt{c}\,x-\sqrt{cx^2}\right)a\sqrt{c}}}{\sqrt{c}}$$

3.5 Problem number 914

$$\int \frac{1}{\sqrt{cx^2}\,(a+bx)^2}\,dx$$

Optimal antiderivative

$$\frac{x}{a\,(bx+a)\,\sqrt{c\,x^2}}+\frac{x\ln(x)}{a^2\sqrt{c\,x^2}}-\frac{x\ln(bx+a)}{a^2\sqrt{c\,x^2}}$$

command

```
integrate(1/(b*x+a)^2/(c*x^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\log\left(\left|-\frac{a}{bx+a}+1\right|\right)}{a^2\sqrt{c}\,\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}-\frac{1}{(bx+a)a\sqrt{c}\,\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}$$

3.6 Problem number 915

$$\int \frac{1}{x\sqrt{cx^2}\,(a+bx)^2}\,dx$$

Optimal antiderivative

$$-\frac{1}{a^2\sqrt{c\,x^2}}-\frac{bx}{a^2\,(bx+a)\,\sqrt{c\,x^2}}-\frac{2bx\ln(x)}{a^3\sqrt{c\,x^2}}+\frac{2bx\ln(bx+a)}{a^3\sqrt{c\,x^2}}$$

command

```
integrate(1/x/(b*x+a)^2/(c*x^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{b\left(\frac{2\log\left(\left|-\frac{a}{bx+a}+1\right|\right)}{a^3\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}+\frac{1}{(bx+a)a^2\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}-\frac{1}{a^3\left(\frac{a}{bx+a}-1\right)\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}\right)}{\sqrt{c}}$$

3.7 Problem number 916

$$\int \frac{1}{x^2\sqrt{cx^2}\,(a+bx)^2}\,dx$$

Optimal antiderivative

$$\frac{2b}{a^3\sqrt{c\,x^2}} - \frac{1}{2a^2x\sqrt{c\,x^2}} + \frac{b^2x}{a^3\,(bx+a)\,\sqrt{c\,x^2}} + \frac{3b^2x\ln(x)}{a^4\sqrt{c\,x^2}} - \frac{3b^2x\ln(bx+a)}{a^4\sqrt{c\,x^2}}$$

command

```
integrate(1/x^2/(b*x+a)^2/(c*x^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{6\,b^2\log\left(\left|-\frac{a}{bx+a}+1\right|\right)}{a^4\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)} + \frac{2\,b^2}{(bx+a)a^3\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)} - \frac{\frac{6\,ab^2}{bx+a}-5\,b^2}{a^4\left(\frac{a}{bx+a}-1\right)^2\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}}{2\,\sqrt{c}}$$

3.8 Problem number 920

$$\int \frac{x^2}{(cx^2)^{3/2}\,(a+bx)^2}\,dx$$

Optimal antiderivative

$$\frac{x}{ac\,(bx+a)\,\sqrt{c\,x^2}} + \frac{x\ln(x)}{a^2c\sqrt{c\,x^2}} - \frac{x\ln(bx+a)}{a^2c\sqrt{c\,x^2}}$$

command

```
integrate(x^2/(c*x^2)^(3/2)/(b*x+a)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{\log\left(\left|-\frac{a}{bx+a}+1\right|\right)}{a^2\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)} + \frac{1}{(bx+a)a\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}}{c^{\frac{3}{2}}}$$

3.9 Problem number 921

$$\int \frac{x}{(cx^2)^{3/2}(a+bx)^2}\,dx$$

Optimal antiderivative

$$-\frac{1}{a^2c\sqrt{cx^2}}-\frac{bx}{a^2c(bx+a)\sqrt{cx^2}}-\frac{2bx\ln(x)}{a^3c\sqrt{cx^2}}+\frac{2bx\ln(bx+a)}{a^3c\sqrt{cx^2}}$$

command

```
integrate(x/(c*x^2)^(3/2)/(b*x+a)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\frac{2b^2\log\left(\left|-\frac{a}{bx+a}+1\right|\right)}{a^3\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}+\frac{b^2}{(bx+a)a^2\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}-\frac{b^2}{a^3\left(\frac{a}{bx+a}-1\right)\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}}{bc^{\frac{3}{2}}}$$

3.10 Problem number 922

$$\int \frac{1}{(cx^2)^{3/2}(a+bx)^2}\,dx$$

Optimal antiderivative

$$\frac{2b}{a^3c\sqrt{cx^2}}-\frac{1}{2a^2cx\sqrt{cx^2}}+\frac{b^2x}{a^3c(bx+a)\sqrt{cx^2}}+\frac{3b^2x\ln(x)}{a^4c\sqrt{cx^2}}-\frac{3b^2x\ln(bx+a)}{a^4c\sqrt{cx^2}}$$

command

```
integrate(1/(c*x^2)^(3/2)/(b*x+a)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{6b^2\log\left(\left|-\frac{a}{bx+a}+1\right|\right)}{a^4\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}+\frac{2b^2}{(bx+a)a^3\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}-\frac{\frac{6ab^2}{bx+a}-5b^2}{a^4\left(\frac{a}{bx+a}-1\right)^2\mathrm{sgn}\left(-\frac{b}{bx+a}+\frac{ab}{(bx+a)^2}\right)}}{2c^{\frac{3}{2}}}$$

4 Test file number 14

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.1_Linear/14_1.1.1.3-a+b_x-^m-c+d_x-^n-e+f_x-^p`

4.1 Problem number 1005

$$\int x^2(1-ax)^{-1-\frac{1}{2}n(1+n)}(1+ax)^{-1-\frac{1}{2}(-1+n)n}\,dx$$

Optimal antiderivative

$$\frac{(ax+1)^{\frac{(1-n)n}{2}}\,(-anx+1)\,(-ax+1)^{-\frac{n(1+n)}{2}}}{a^3n\,(-n^2+1)}$$

command

```
integrate(x^2*(-a*x+1)^(-1-1/2*n*(1+n))*(a*x+1)^(-1-1/2*(-1+n)*n),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{a^3nx^3e^{(-\frac{1}{2}n^2\log(ax+1)-\frac{1}{2}n^2\log(-ax+1)+\frac{1}{2}n\log(ax+1)-\frac{1}{2}n\log(-ax+1)-\log(ax+1)-\log(-ax+1))}-a^2x^2e^{(-\frac{1}{2}n^2\log(ax+1)-\frac{1}{2}n^2\log(-ax+1)+\frac{1}{2}n\log(ax+1)-\frac{1}{2}n\log(-ax+1)-\log(ax+1)-\log(-ax+1))}}{}$$

5 Test file number 20

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.2_Quadratic/20_1.1.2.3-a+b_x^2-^p-c+d_x^2-^q`

5.1 Problem number 224

$$\int \frac{1}{\sqrt{2-2x^2}\,\sqrt{1-x^2}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}(x)\,\sqrt{2}}{2}$$

command

```
integrate(1/(-2*x^2+2)^(1/2)/(-x^2+1)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}\sqrt{2}\log(x+1)-\frac{1}{4}\sqrt{2}\log(x-1)$$

5.2 Problem number 231

$$\int \frac{1}{\sqrt{1+x^2}\sqrt{2+2x^2}}\,dx$$

Optimal antiderivative

$$\frac{\arctan(x)\sqrt{2}}{2}$$

command

```
integrate(1/(x^2+1)^(1/2)/(2*x^2+2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}\sqrt{2}\,i\log(ix-1)-\frac{1}{4}\sqrt{2}\,i\log(-ix-1)$$

6 Test file number 25

Test folder name:

```
test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.3_General/25_1.1.3.2-c_x-
^m-a+b_x^n-^p
```

6.1 Problem number 1735

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2} x}\,dx$$

Optimal antiderivative

$$\frac{2\,\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{3}{2}}}-\frac{2}{a\sqrt{a+\frac{b}{x}}}$$

command

```
integrate(1/(a+b/x)^(3/2)/x,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\,\arctan\left(\frac{\sqrt{\frac{ax+b}{x}}}{\sqrt{-a}}\right)}{\sqrt{-a}\,a}-\frac{2}{a\sqrt{\frac{ax+b}{x}}}$$

6.2 Problem number 1738

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2} x^4}\,dx$$

Optimal antiderivative

$$-\frac{2\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}{3b^3}+\frac{2a^2}{b^3\sqrt{a+\frac{b}{x}}}+\frac{4a\sqrt{a+\frac{b}{x}}}{b^3}$$

command

```
integrate(1/(a+b/x)^(3/2)/x^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{3\,a^2}{\sqrt{\frac{ax+b}{x}}}+6\,a\sqrt{\frac{ax+b}{x}}-\frac{(ax+b)\sqrt{\frac{ax+b}{x}}}{x}\right)}{3\,b^3}$$

6.3 Problem number 1739

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2}x^5}\,dx$$

Optimal antiderivative

$$\frac{2a\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}{b^4}-\frac{2\left(a+\frac{b}{x}\right)^{\frac{5}{2}}}{5b^4}-\frac{2a^3}{b^4\sqrt{a+\frac{b}{x}}}-\frac{6a^2\sqrt{a+\frac{b}{x}}}{b^4}$$

command

```
integrate(1/(a+b/x)^(3/2)/x^5,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\frac{5\,a^3}{\sqrt{\frac{ax+b}{x}}}+15\,a^2\sqrt{\frac{ax+b}{x}}-\frac{5\,(ax+b)a\sqrt{\frac{ax+b}{x}}}{x}+\frac{(ax+b)^2\sqrt{\frac{ax+b}{x}}}{x^2}\right)}{5\,b^4}$$

6.4 Problem number 1740

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2} x^6}\,dx$$

Optimal antiderivative

$$-\frac{4a^2\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}{b^5}+\frac{8a\left(a+\frac{b}{x}\right)^{\frac{5}{2}}}{5b^5}-\frac{2\left(a+\frac{b}{x}\right)^{\frac{7}{2}}}{7b^5}+\frac{2a^4}{b^5\sqrt{a+\frac{b}{x}}}+\frac{8a^3\sqrt{a+\frac{b}{x}}}{b^5}$$

command

```
integrate(1/(a+b/x)^(3/2)/x^6,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{35\,a^4}{\sqrt{\frac{ax+b}{x}}}+140\,a^3\sqrt{\frac{ax+b}{x}}-\frac{70\,(ax+b)a^2\sqrt{\frac{ax+b}{x}}}{x}+\frac{28\,(ax+b)^2a\sqrt{\frac{ax+b}{x}}}{x^2}-\frac{5\,(ax+b)^3\sqrt{\frac{ax+b}{x}}}{x^3}\right)}{35\,b^5}$$

6.5 Problem number 1741

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2} x^7}\,dx$$

Optimal antiderivative

$$\frac{20a^3\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}{3b^6}-\frac{4a^2\left(a+\frac{b}{x}\right)^{\frac{5}{2}}}{b^6}+\frac{10a\left(a+\frac{b}{x}\right)^{\frac{7}{2}}}{7b^6}-\frac{2\left(a+\frac{b}{x}\right)^{\frac{9}{2}}}{9b^6}-\frac{2a^5}{b^6\sqrt{a+\frac{b}{x}}}-\frac{10a^4\sqrt{a+\frac{b}{x}}}{b^6}$$

command

```
integrate(1/(a+b/x)^(3/2)/x^7,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\frac{63\,a^5}{\sqrt{\frac{ax+b}{x}}}+315\,a^4\sqrt{\frac{ax+b}{x}}-\frac{210\,(ax+b)a^3\sqrt{\frac{ax+b}{x}}}{x}+\frac{126\,(ax+b)^2a^2\sqrt{\frac{ax+b}{x}}}{x^2}-\frac{45\,(ax+b)^3a\sqrt{\frac{ax+b}{x}}}{x^3}+\frac{7\,(ax}{63\,b^6}$$

6.6 Problem number 1748

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{5/2}x^4}\,dx$$

Optimal antiderivative

$$\frac{2a^2}{3b^3\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}-\frac{4a}{b^3\sqrt{a+\frac{b}{x}}}-\frac{2\sqrt{a+\frac{b}{x}}}{b^3}$$

command

```
integrate(1/(a+b/x)^(5/2)/x^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{\left(a^2-\frac{6\,(ax+b)a}{x}\right)x}{(ax+b)\sqrt{\frac{ax+b}{x}}}-3\sqrt{\frac{ax+b}{x}}\right)}{3\,b^3}$$

6.7 Problem number 1750

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{5/2}x^6}\,dx$$

Optimal antiderivative

$$\frac{2a^4}{3b^5\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}+\frac{8a\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}{3b^5}-\frac{2\left(a+\frac{b}{x}\right)^{\frac{5}{2}}}{5b^5}-\frac{8a^3}{b^5\sqrt{a+\frac{b}{x}}}-\frac{12a^2\sqrt{a+\frac{b}{x}}}{b^5}$$

command

```
integrate(1/(a+b/x)^(5/2)/x^6,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(90\,a^2\sqrt{\frac{ax+b}{x}}-\frac{20\,(ax+b)a\sqrt{\frac{ax+b}{x}}}{x}-\frac{5\left(a^4-\frac{12\,(ax+b)a^3}{x}\right)x}{(ax+b)\sqrt{\frac{ax+b}{x}}}+\frac{3\,(ax+b)^2\sqrt{\frac{ax+b}{x}}}{x^2}\right)}{15\,b^5}$$

6.8 Problem number 1751

$$\int\frac{1}{\left(a+\frac{b}{x}\right)^{5/2}x^7}\,dx$$

Optimal antiderivative

$$-\frac{2a^5}{3b^6\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}-\frac{20a^2\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}{3b^6}+\frac{2a\left(a+\frac{b}{x}\right)^{\frac{5}{2}}}{b^6}-\frac{2\left(a+\frac{b}{x}\right)^{\frac{7}{2}}}{7b^6}+\frac{10a^4}{b^6\sqrt{a+\frac{b}{x}}}+\frac{20a^3\sqrt{a+\frac{b}{x}}}{b^6}$$

command

```
integrate(1/(a+b/x)^(5/2)/x^7,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(210\,a^3\sqrt{\frac{ax+b}{x}}-\frac{70\,(ax+b)a^2\sqrt{\frac{ax+b}{x}}}{x}+\frac{21\,(ax+b)^2a\sqrt{\frac{ax+b}{x}}}{x^2}-\frac{7\left(a^5-\frac{15\,(ax+b)a^4}{x}\right)x}{(ax+b)\sqrt{\frac{ax+b}{x}}}-\frac{3\,(ax+b)^3\sqrt{\frac{ax+b}{x}}}{x^3}\right)}{21\,b^6}$$

6.9 Problem number 2991

$$\int \frac{1}{\sqrt{a+b\sqrt{\frac{c}{x}}}\,x^2}\,dx$$

Optimal antiderivative

$$-\frac{4\left(a+b\sqrt{\frac{c}{x}}\right)^{\frac{3}{2}}}{3b^2c}+\frac{4a\sqrt{a+b\sqrt{\frac{c}{x}}}}{b^2c}$$

command

```
integrate(1/x^2/(a+b*(c/x)^(1/2))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{4\left(\left(b\sqrt{\frac{c}{x}}+a\right)^{\frac{3}{2}}b-3\sqrt{b\sqrt{\frac{c}{x}}+a}\,ab\right)\operatorname{sgn}\left(\left(b\sqrt{\frac{c}{x}}+a\right)b-ab\right)}{3\,b^3c}$$

6.10 Problem number 2992

$$\int \frac{1}{\sqrt{a+b\sqrt{\frac{c}{x}}}\,x^3}\,dx$$

Optimal antiderivative

$$-\frac{4a^2\left(a+b\sqrt{\frac{c}{x}}\right)^{\frac{3}{2}}}{b^4c^2}+\frac{12a\left(a+b\sqrt{\frac{c}{x}}\right)^{\frac{5}{2}}}{5b^4c^2}-\frac{4\left(a+b\sqrt{\frac{c}{x}}\right)^{\frac{7}{2}}}{7b^4c^2}+\frac{4a^3\sqrt{a+b\sqrt{\frac{c}{x}}}}{b^4c^2}$$

command

```
integrate(1/x^3/(a+b*(c/x)^(1/2))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{4\left(5\left(b\sqrt{\frac{c}{x}}+a\right)^{\frac{7}{2}}\operatorname{sgn}\left(\left(b\sqrt{\frac{c}{x}}+a\right)b-ab\right)-21\left(b\sqrt{\frac{c}{x}}+a\right)^{\frac{5}{2}}a\operatorname{sgn}\left(\left(b\sqrt{\frac{c}{x}}+a\right)b-ab\right)+35\left(b\sqrt{\frac{c}{x}}+a\right.\right.}{35\,b^4c^2}$$

7 Test file number 26

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.3_General/26_1.1.3.3-a+b_x^n-^p-c+d_x^n-^q`

7.1 Problem number 245

$$\int \frac{\left(c+\frac{d}{x}\right)^3}{\sqrt{a+\frac{b}{x}}}\,dx$$

Optimal antiderivative

$$-\frac{c^2(-6ad+bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{3}{2}}} - \frac{d\left(-4a^2d^2+18abcd+6b^2c^2+\frac{bd(2ad+3bc)}{x}\right)\sqrt{a+\frac{b}{x}}}{3a\,b^2} + \frac{c\left(c+\frac{d}{x}\right)^2 x\sqrt{a+\frac{b}{x}}}{a}$$

command

```
integrate((c+d/x)^3/(a+b/x)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{3\,b^2c^3\sqrt{\frac{ax+b}{x}}}{\left(a-\frac{ax+b}{x}\right)a} - \frac{3\left(b^2c^3-6\,abc^2d\right)\arctan\left(\frac{\sqrt{\frac{ax+b}{x}}}{\sqrt{-a}}\right)}{\sqrt{-a}\,a} + \frac{2\left(9\,b^3cd^2\sqrt{\frac{ax+b}{x}} - 3\,ab^2d^3\sqrt{\frac{ax+b}{x}} + \frac{(ax+b)b^2d^3\sqrt{\frac{ax+b}{x}}}{x}\right)}{b^3}}{3\,b}$$

7.2 Problem number 246

$$\int \frac{\left(c+\frac{d}{x}\right)^2}{\sqrt{a+\frac{b}{x}}}\,dx$$

Optimal antiderivative

$$-\frac{c(-4ad+bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{3}{2}}}-\frac{2d^2\sqrt{a+\frac{b}{x}}}{b}+\frac{c^2x\sqrt{a+\frac{b}{x}}}{a}$$

command

```
integrate((c+d/x)^2/(a+b/x)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{b^2c^2\sqrt{\frac{ax+b}{x}}}{\left(a-\frac{ax+b}{x}\right)a}+2\,d^2\sqrt{\frac{ax+b}{x}}-\frac{\left(b^2c^2-4\,abcd\right)\arctan\left(\frac{\sqrt{\frac{ax+b}{x}}}{\sqrt{-a}}\right)}{\sqrt{-a}\,a}}{b}$$

7.3 Problem number 249

$$\int \frac{1}{\sqrt{a+\frac{b}{x}}\,\left(c+\frac{d}{x}\right)}\,dx$$

Optimal antiderivative

$$-\frac{(2ad+bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{3}{2}}c^2}-\frac{2d^{\frac{3}{2}}\arctan\left(\frac{\sqrt{d}\,\sqrt{a+\frac{b}{x}}}{\sqrt{-ad+bc}}\right)}{c^2\sqrt{-ad+bc}}+\frac{x\sqrt{a+\frac{b}{x}}}{ac}$$

command

```
integrate(1/(c+d/x)/(a+b/x)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-b^2\left(\frac{2\,d^2\arctan\left(\frac{{}^{d}\sqrt{\frac{ax+b}{x}}}{\sqrt{bcd-ad^2}}\right)}{\sqrt{bcd-ad^2}\,b^2c^2}+\frac{\sqrt{\frac{ax+b}{x}}}{\left(a-\frac{ax+b}{x}\right)abc}-\frac{(bc+2\,ad)\arctan\left(\frac{\sqrt{\frac{ax+b}{x}}}{\sqrt{-a}}\right)}{\sqrt{-a}\,ab^2c^2}\right)$$

7.4 Problem number 252

$$\int\frac{\left(c+\frac{d}{x}\right)^3}{\left(a+\frac{b}{x}\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{3c^2(-2ad+bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{5}{2}}}+\frac{(-2ad+bc)\left(2a^2d^2-2abcd+3b^2c^2\right)-\frac{ab\,d^2(2ad+bc)}{x}}{a^2b^2\sqrt{a+\frac{b}{x}}}+\frac{c\left(c+\frac{d}{x}\right)^2x}{a\sqrt{a+\frac{b}{x}}}$$

command

```
integrate((c+d/x)^3/(a+b/x)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2d^3\sqrt{\frac{ax+b}{x}}}{b}-\frac{3\left(b^2c^3-2abc^2d\right)\arctan\left(\frac{\sqrt{\frac{ax+b}{x}}}{\sqrt{-a}}\right)}{\sqrt{-a}\,a^2}-\frac{2ab^3c^3-6a^2b^2c^2d+6a^3bcd^2-2a^4d^3-\frac{3(ax+b)b^3c^3}{x}+\frac{6(ax+b)ab^2c^2d}{x}-\frac{6(ax+b)}{x}}{\left(a\sqrt{\frac{ax+b}{x}}-\frac{(ax+b)\sqrt{\frac{ax+b}{x}}}{x}\right)a^2b}$$

$$-\frac{}{b}$$

7.5 Problem number 256

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2}\left(c+\frac{d}{x}\right)}\,dx$$

Optimal antiderivative

$$\frac{2d^{\frac{5}{2}}\arctan\left(\frac{\sqrt{d}\,\sqrt{a+\frac{b}{x}}}{\sqrt{-ad+bc}}\right)}{c^2\left(-ad+bc\right)^{\frac{3}{2}}}-\frac{(2ad+3bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{5}{2}}c^2}$$
$$+\frac{b(-ad+3bc)}{a^2c\left(-ad+bc\right)\sqrt{a+\frac{b}{x}}}+\frac{x}{ac\sqrt{a+\frac{b}{x}}}$$

command

```
integrate(1/(a+b/x)^(3/2)/(c+d/x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{2\,d^3\arctan\left(\frac{d\sqrt{\frac{ax+b}{x}}}{\sqrt{bcd-ad^2}}\right)}{\left(b^3c^3-ab^2c^2d\right)\sqrt{bcd-ad^2}}+\frac{2\,abc-\frac{3\,(ax+b)bc}{x}+\frac{(ax+b)ad}{x}}{\left(a^2b^2c^2-a^3bcd\right)\left(a\sqrt{\frac{ax+b}{x}}-\frac{(ax+b)\sqrt{\frac{ax+b}{x}}}{x}\right)}+\frac{(3\,bc+2\,ad)\arctan\left(\frac{\sqrt{\frac{a}{}}}{\sqrt{-a}\,a^2b^2c^2}\right.\right.$$

7.6 Problem number 257

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2}\left(c+\frac{d}{x}\right)^{2}}\,dx$$

Optimal antiderivative

$$\frac{d^{\frac{5}{2}}(-4ad+7bc)\arctan\left(\frac{\sqrt{d}\,\sqrt{a+\frac{b}{x}}}{\sqrt{-ad+bc}}\right)}{c^3(-ad+bc)^{\frac{5}{2}}}-\frac{(4ad+3bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{5}{2}}c^3}$$
$$+\frac{b\left(2a^2d^2-2abcd+3b^2c^2\right)}{a^2c^2(-ad+bc)^2\sqrt{a+\frac{b}{x}}}+\frac{d(-2ad+bc)}{ac^2(-ad+bc)\left(c+\frac{d}{x}\right)\sqrt{a+\frac{b}{x}}}+\frac{x}{ac\left(c+\frac{d}{x}\right)\sqrt{a+\frac{b}{x}}}$$

command

```
integrate(1/(a+b/x)^(3/2)/(c+d/x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$b^3\left(\frac{\left(7\,bcd^3-4\,ad^4\right)\arctan\left(\frac{d\sqrt{\frac{ax+b}{x}}}{\sqrt{bcd-ad^2}}\right)}{\left(b^5c^5-2\,ab^4c^4d+a^2b^3c^3d^2\right)\sqrt{bcd-ad^2}}+\frac{2\,ab^3c^3-2\,a^2b^2c^2d-\frac{3\,(ax+b)b^3c^3}{x}+\frac{7\,(ax+b)ab^2c^2d}{x}-\frac{3\,(ax+b)a^2bcd}{x}}{\left(a^2b^4c^4-2\,a^3b^3c^3d+a^4b^2c^2d^2\right)\left(abc\sqrt{\frac{ax+b}{x}}-a^2d\sqrt{\frac{ax+b}{x}}-\right.}\right.$$

7.7 Problem number 258

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{3/2}\left(c+\frac{d}{x}\right)^{3}}\,dx$$

Optimal antiderivative

$$\frac{3d^{\frac{5}{2}}\left(8a^2d^2-24abcd+21b^2c^2\right)\arctan\left(\frac{\sqrt{d}\,\sqrt{a+\frac{b}{x}}}{\sqrt{-ad+bc}}\right)}{4c^4\left(-ad+bc\right)^{\frac{7}{2}}}$$
$$-\frac{3(2ad+bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{5}{2}}c^4}+\frac{3b(-ad+2bc)\left(4a^2d^2-abcd+2b^2c^2\right)}{4a^2c^3\left(-ad+bc\right)^3\sqrt{a+\frac{b}{x}}}$$
$$+\frac{d(-3ad+2bc)}{2a\,c^2\left(-ad+bc\right)\left(c+\frac{d}{x}\right)^2\sqrt{a+\frac{b}{x}}}$$
$$+\frac{d\left(12a^2d^2-21abcd+4b^2c^2\right)}{4a\,c^3\left(-ad+bc\right)^2\left(c+\frac{d}{x}\right)\sqrt{a+\frac{b}{x}}}+\frac{x}{ac\left(c+\frac{d}{x}\right)^2\sqrt{a+\frac{b}{x}}}$$

command

```
integrate(1/(a+b/x)^(3/2)/(c+d/x)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}\,b^4\left(\frac{3\left(21\,b^2c^2d^3-24\,abcd^4+8\,a^2d^5\right)\arctan\left(\frac{d\sqrt{\frac{ax+b}{x}}}{\sqrt{bcd-ad^2}}\right)}{\left(b^7c^7-3\,ab^6c^6d+3\,a^2b^5c^5d^2-a^3b^4c^4d^3\right)\sqrt{bcd-ad^2}}+\frac{4\left(2\,ab^3c^3-\frac{3\,(ax+b)b^3c^3}{x}+\frac{3\,(ax+b)ab^2c^2d}{x}-\right.}{\left(a^2b^6c^6-3\,a^3b^5c^5d+3\,a^4b^4c^4d^2-a^5b^3c^3d^3\right)\left(a\right.}\right.$$

7.8 Problem number 263

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{5/2}\left(c+\frac{d}{x}\right)}\,dx$$

Optimal antiderivative

$$\frac{b(-3ad+5bc)}{3a^2c\left(-ad+bc\right)\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}+\frac{x}{ac\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}-\frac{2d^{\frac{7}{2}}\arctan\left(\frac{\sqrt{d}\,\sqrt{a+\frac{b}{x}}}{\sqrt{-ad+bc}}\right)}{c^2\left(-ad+bc\right)^{\frac{5}{2}}}$$
$$-\frac{(2ad+5bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{7}{2}}c^2}+\frac{b\left(a^2d^2-8abcd+5b^2c^2\right)}{a^3c\left(-ad+bc\right)^2\sqrt{a+\frac{b}{x}}}$$

command

```
integrate(1/(a+b/x)^(5/2)/(c+d/x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{3}\left(\frac{6\,d^4\arctan\left(\frac{d\sqrt{\frac{ax+b}{x}}}{\sqrt{bcd-ad^2}}\right)}{\left(b^4c^4-2\,ab^3c^3d+a^2b^2c^2d^2\right)\sqrt{bcd-ad^2}}-\frac{2\left(abc-a^2d+\frac{6\,(ax+b)bc}{x}-\frac{9\,(ax+b)ad}{x}\right)x}{\left(a^3b^2c^2-2\,a^4bcd+a^5d^2\right)(ax+b)\sqrt{\frac{ax+b}{x}}}+\frac{3\sqrt{\frac{ax+b}{x}}}{\left(a-\frac{ax+b}{x}\right)a^3bc}\right.$$

7.9 Problem number 264

$$\int \frac{1}{\left(a+\frac{b}{x}\right)^{5/2}\left(c+\frac{d}{x}\right)^{2}}\,dx$$

Optimal antiderivative

$$\frac{b\left(6a^2d^2-6abcd+5b^2c^2\right)}{3a^2c^2\left(-ad+bc\right)^2\left(a+\frac{b}{x}\right)^{\frac{3}{2}}}+\frac{d(-2ad+bc)}{a\,c^2\left(-ad+bc\right)\left(a+\frac{b}{x}\right)^{\frac{3}{2}}\left(c+\frac{d}{x}\right)}$$
$$+\frac{x}{ac\left(a+\frac{b}{x}\right)^{\frac{3}{2}}\left(c+\frac{d}{x}\right)}-\frac{d^{\frac{7}{2}}(-4ad+9bc)\arctan\left(\frac{\sqrt{d}\,\sqrt{a+\frac{b}{x}}}{\sqrt{-ad+bc}}\right)}{c^3\left(-ad+bc\right)^{\frac{7}{2}}}$$
$$-\frac{(4ad+5bc)\operatorname{arctanh}\left(\frac{\sqrt{a+\frac{b}{x}}}{\sqrt{a}}\right)}{a^{\frac{7}{2}}c^3}+\frac{b(-2ad+bc)\left(a^2d^2-abcd+5b^2c^2\right)}{a^3c^2\left(-ad+bc\right)^3\sqrt{a+\frac{b}{x}}}$$

command

```
integrate(1/(a+b/x)^(5/2)/(c+d/x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{3}b^3\left(\frac{3\left(9\,bcd^4-4\,ad^5\right)\arctan\left(\frac{d\sqrt{\frac{ax+b}{x}}}{\sqrt{bcd-ad^2}}\right)}{\left(b^6c^6-3\,ab^5c^5d+3\,a^2b^4c^4d^2-a^3b^3c^3d^3\right)\sqrt{bcd-ad^2}}-\frac{2\left(abc-a^2d+\frac{6\,(ax+b)bc}{x}-\frac{12\,(ax+b)ad}{x}\right)x}{\left(a^3b^3c^3-3\,a^4b^2c^2d+3\,a^5bcd^2-a^6d^3\right)(ax+b)\sqrt{}}\right.$$

8 Test file number 27

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.3_General/27_1.1.3.4-e_x-^m-a+b_x^n-^p-c+d_x^n-^q`

8.1 Problem number 1054

$$\int x^{-1+14n}(b+cx^n)^{13}\left(b+2cx^n\right)\,dx$$

Optimal antiderivative

$$\frac{x^{14n}(b+c\,x^n)^{14}}{14n}$$

command

```
integrate(x^(-1+14*n)*(b+c*x^n)^13*(b+2*c*x^n),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{c^{14}x^{28\,n}+14\,bc^{13}x^{27\,n}+91\,b^2c^{12}x^{26\,n}+364\,b^3c^{11}x^{25\,n}+1001\,b^4c^{10}x^{24\,n}+2002\,b^5c^9x^{23\,n}+3003\,b^6c^8x^{22\,n}+3432\,b^7}{14}$$

9 Test file number 33

Test folder name:

`test_cases/1_Algebraic_functions/1.2_Trinomial_products/1.2.1_Quadratic/33_1.2.1.2-d+e_x-^m-a+b_x+c_x^2-^p`

9.1 Problem number 841

$$\int \frac{d+ex}{\left(d^2-e^2x^2\right)^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{ex+d}{3de\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{2x}{3d^3\sqrt{-e^2x^2+d^2}}$$

command

```
integrate((e*x+d)/(-e^2*x^2+d^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(x\left(\frac{2x^2e^2}{d^3}-\frac{3}{d}\right)-e^{(-1)}\right)}{3\left(x^2e^2-d^2\right)^2}$$

9.2 Problem number 853

$$\int \frac{(d+ex)^2}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{\frac{2ex}{5}+\frac{2d}{5}}{e\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{x}{5d^2\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{2x}{5d^4\sqrt{-e^2x^2+d^2}}$$

command

```
integrate((e*x+d)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(x^2\left(\frac{2x^2e^4}{d^4}-\frac{5e^2}{d^2}\right)+5\right)x+2de^{(-1)}\right)}{5\left(x^2e^2-d^2\right)^3}$$

9.3 Problem number 854

$$\int \frac{d+ex}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{ex+d}{5de\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{4x}{15d^3\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{8x}{15d^5\sqrt{-e^2x^2+d^2}}$$

command

```
integrate((e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(4\,x^2\left(\frac{2\,x^2e^4}{d^5}-\frac{5\,e^2}{d^3}\right)+\frac{15}{d}\right)x+3\,e^{(-1)}\right)}{15\left(x^2e^2-d^2\right)^3}$$

9.4 Problem number 1957

$$\int \frac{(d+ex)^2}{(ade+(cd^2+ae^2)\,x+cdex^2)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\frac{2cdex+a\,e^2+c\,d^2}{2\sqrt{c}\,\sqrt{d}\,\sqrt{e}\,\sqrt{ade+(a\,e^2+c\,d^2)\,x+cde\,x^2}}\right)\sqrt{e}}{c^{\frac{3}{2}}d^{\frac{3}{2}}}-\frac{2(ex+d)}{cd\sqrt{ade+(a\,e^2+c\,d^2)\,x+cde\,x^2}}$$

command

```
integrate((e*x+d)^2/(a*d*e+(a*e^2+c*d^2)*x+c*d*e*x^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\frac{\left(c^2d^4e-2\,acd^2e^3+a^2e^5\right)x}{c^3d^5-2\,ac^2d^3e^2+a^2cde^4}+\frac{c^2d^5-2\,acd^3e^2+a^2de^4}{c^3d^5-2\,ac^2d^3e^2+a^2cde^4}\right)}{\sqrt{cdx^2e+ade+(cd^2+ae^2)x}}$$
$$-\frac{\sqrt{cd}\,e^{\frac{1}{2}}\log\left(\left|-\sqrt{cd}\,cd^2e^{\frac{1}{2}}-2\left(\sqrt{cd}\,xe^{\frac{1}{2}}-\sqrt{cdx^2e+ade+(cd^2+ae^2)x}\right)cde-\sqrt{cd}\,ae^{\frac{5}{2}}\right|\right)}{c^2d^2}$$

9.5 Problem number 1958

$$\int \frac{d+ex}{\left(ade+\left(cd^2+ae^2\right)x+cdex^2\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{2(ex+d)}{\left(-a\,e^2+c\,d^2\right)\sqrt{ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2}}$$

command

```
integrate((e*x+d)/(a*d*e+(a*e^2+c*d^2)*x+c*d*e*x^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\frac{\left(cd^2e-ae^3\right)x}{c^2d^4-2\,acd^2e^2+a^2e^4}+\frac{cd^3-ade^2}{c^2d^4-2\,acd^2e^2+a^2e^4}\right)}{\sqrt{cdx^2e+ade+\left(cd^2+ae^2\right)x}}$$

9.6 Problem number 1966

$$\int \frac{(d+ex)^4}{\left(ade+\left(cd^2+ae^2\right)x+cdex^2\right)^{5/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}&-\frac{2(ex+d)^3}{3cd\left(ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2\right)^{\frac{3}{2}}}\\&+\frac{e^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{2cdex+a\,e^2+c\,d^2}{2\sqrt{c}\,\sqrt{d}\,\sqrt{e}\,\sqrt{ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2}}\right)}{c^{\frac{5}{2}}d^{\frac{5}{2}}}\\&-\frac{2e(ex+d)}{c^2d^2\sqrt{ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2}}\end{aligned}$$

command

```
integrate((e*x+d)^4/(a*d*e+(a*e^2+c*d^2)*x+c*d*e*x^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\left(\left(\frac{4\left(c^5d^9e^3-4\,ac^4d^7e^5+6\,a^2c^3d^5e^7-4\,a^3c^2d^3e^9+a^4cde^{11}\right)x}{c^6d^{10}-4\,ac^5d^8e^2+6\,a^2c^4d^6e^4-4\,a^3c^3d^4e^6+a^4c^2d^2e^8}+\frac{3\left(3\,c^5d^{10}e^2-11\,ac^4d^8e^4+14\,a^2c^3d^6e^6-6\,a^3c^2d^4e^8-a^4cd^2e^{10}+a^5e^{12}\right)}{c^6d^{10}-4\,ac^5d^8e^2+6\,a^2c^4d^6e^4-4\,a^3c^3d^4e^6+a^4c^2d^2e^8}\right)x\right.\right.}{3\left(cdx^2e+ade+\right.}$$

$$-\frac{\sqrt{cd}\,e^{\frac{3}{2}}\log\left(\left|-\sqrt{cd}\,cd^2e^{\frac{1}{2}}-2\left(\sqrt{cd}\,xe^{\frac{1}{2}}-\sqrt{cdx^2e+ade+(cd^2+ae^2)x}\right)cde-\sqrt{cd}\,ae^{\frac{5}{2}}\right|\right)}{c^3d^3}$$

9.7 Problem number 1967

$$\int \frac{(d+ex)^3}{\left(ade+\left(cd^2+ae^2\right)x+cdex^2\right)^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2(ex+d)^3}{3\left(-a\,e^2+c\,d^2\right)\left(ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2\right)^{\frac{3}{2}}}$$

command

```
integrate((e*x+d)^3/(a*d*e+(a*e^2+c*d^2)*x+c*d*e*x^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\left(\left(\frac{\left(c^3d^6e^3-3\,ac^2d^4e^5+3\,a^2cd^2e^7-a^3e^9\right)x}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3cd^2e^6+a^4e^8}+\frac{3\left(c^3d^7e^2-3\,ac^2d^5e^4+3\,a^2cd^3e^6-a^3de^8\right)}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3cd^2e^6+a^4e^8}\right)x+\frac{3\left(c^3d^8e-3\,ac^2d^6e^3+3\,a^2cd^4e\right.}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3cd^2e^6+a^4e^8}\right)}{3\left(cdx^2e+ade+\left(cd^2+ae^2\right)x\right)^{\frac{3}{2}}}$$

9.8 Problem number 1968

$$\int \frac{(d+ex)^2}{\left(ade+\left(cd^2+ae^2\right)x+cdex^2\right)^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2(ex+d)}{3cd\left(ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2\right)^{\frac{3}{2}}}+\frac{2e\left(2cdex+a\,e^2+c\,d^2\right)}{3cd\left(-a\,e^2+c\,d^2\right)^2\sqrt{ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2}}$$

command

```
integrate((e*x+d)^2/(a*d*e+(a*e^2+c*d^2)*x+c*d*e*x^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\left(\left(\frac{2\left(c^3d^5e^3-2\,ac^2d^3e^5+a^2cde^7\right)x}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3cd^2e^6+a^4e^8}+\frac{3\left(c^3d^6e^2-ac^2d^4e^4-a^2cd^2e^6+a^3e^8\right)}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3cd^2e^6+a^4e^8}\right)x+\frac{6\left(ac^2d^5e^3-2\,a^2cd^3e^5+a^3c\right.}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3c}\right.}{3\left(cdx^2e+ade+\left(cd^2+ae^2\right)x\right)^{\frac{3}{2}}}$$

9.9 Problem number 1969

$$\int \frac{d+ex}{\left(ade+\left(cd^2+ae^2\right)x+cdex^2\right)^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2(ex+d)}{3\left(-a\,e^2+c\,d^2\right)\left(ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2\right)^{\frac{3}{2}}}+\frac{8e\left(2cdex+a\,e^2+c\,d^2\right)}{3\left(-a\,e^2+c\,d^2\right)^3\sqrt{ade+\left(a\,e^2+c\,d^2\right)x+cde\,x^2}}$$

command

```
integrate((e*x+d)/(a*d*e+(a*e^2+c*d^2)*x+c*d*e*x^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\left(4\left(\frac{2\left(c^3d^4e^3-ac^2d^2e^5\right)x}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3cd^2e^6+a^4e^8}+\frac{3\left(c^3d^5e^2-a^2cde^6\right)}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3cd^2e^6+a^4e^8}\right)x+\frac{3\left(c^3d^6e+5\,ac^2d^4e^3-5\,a^2cd^2\right.}{c^4d^8-4\,ac^3d^6e^2+6\,a^2c^2d^4e^4-4\,a^3c}\right.}{3\left(cdx^2e+ade+\left(cd^2+ae^2\right)x\right)^{\frac{3}{2}}}$$

10 Test file number 34

Test folder name:

```
test_cases/1_Algebraic_functions/1.2_Trinomial_products/1.2.1_Quadratic/34_1.2.1.3-
d+e_x-^m-f+g_x-a+b_x+c_x^2-^p
```

10.1 Problem number 1179

$$\int \frac{(A+Bx)\left(bx+cx^2\right)^{3/2}}{(d+ex)^5}\,dx$$

Optimal antiderivative

$$\frac{\left(d\left(3Ab\,e^2-Bd(-5be+8cd)\right)-e(Bd(-11be+14cd)-3Ae(-be+2cd))\,x\right)\left(c\,x^2+bx\right)^{\frac{3}{2}}}{24d\,e^2\,(-be+cd)\,(ex+d)^4}$$
$$+\frac{2B\,c^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{x\sqrt{c}}{\sqrt{c\,x^2+bx}}\right)}{e^5}$$
$$+\frac{\left(3A\,b^4e^5-Bd\left(-5b^4e^4-40b^3cd\,e^3+240b^2c^2d^2e^2-320b\,c^3d^3e+128c^4d^4\right)\right)\operatorname{arctanh}\left(\frac{bd+(-be+2cd)x}{2\sqrt{d}\,\sqrt{-be+cd}\,\sqrt{c\,x^2+b}\right.}}{128d^{\frac{5}{2}}e^5\,(-be+cd)^{\frac{5}{2}}}$$
$$-\frac{\left(d\left(3A\,b^3e^4+Bd\left(5b^3e^3+40b^2cd\,e^2-112b\,c^2d^2e+64c^3d^3\right)\right)+e\left(3A\,b^2e^3(-be+2cd)+Bd\left(-5b^3e^3+98b^2cd\,e^2-\right.\right.\right.}{64d^2e^4\,(-be+cd)^2\,(ex+d)^2}$$

command

```
integrate((B*x+A)*(c*x^2+b*x)^(3/2)/(e*x+d)^5,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

10.2 Problem number 2225

$$\int \frac{(d+ex)^3(f+gx)}{\left(cd^2-bde-be^2x-ce^2x^2\right)^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{2(-beg+cdg+cef)\,(ex+d)^3}{3c\,e^2\,(-be+2cd)\left(d\,(-be+cd)-b\,e^2x-c\,e^2x^2\right)^{\frac{3}{2}}}$$
$$+\frac{g\arctan\left(\frac{e(2cx+b)}{2\sqrt{c}\,\sqrt{d\,(-be+cd)-b\,e^2x-c\,e^2x^2}}\right)}{c^{\frac{5}{2}}e^2}-\frac{2g(ex+d)}{c^2e^2\sqrt{d\,(-be+cd)-b\,e^2x-c\,e^2x^2}}$$

command

```
integrate((e*x+d)^3*(g*x+f)/(-c*e^2*x^2-b*e^2*x-b*d*e+c*d^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{-ce^2}\, ge^{(-3)} \log\left(\left|-2\left(\sqrt{-ce^2}\, x-\sqrt{-cx^2e^2+cd^2-bxe^2-bde}\right)c-\sqrt{-ce^2}\, b\right|\right)}{c^3}$$
$$+\frac{2\sqrt{-cx^2e^2+cd^2-bxe^2-bde}\left(\left(\left(\frac{(56c^5d^4ge^4+8c^5d^3fe^5-116bc^4d^3ge^5-12bc^4d^2fe^6+90b^2c^3d^2ge^6+6b^2c^3dfe^7-31b^3c^2dge^7-b^3c^2}{16c^6d^4e^3-32bc^5d^3e^4+24b^2c^4d^2e^5-8b^3c^3de^6+b^4c^2e^7}\right.\right.\right.\right.$$

10.3 Problem number 2227

$$\int \frac{(d+ex)(f+gx)}{\left(cd^2-bde-be^2x-ce^2x^2\right)^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{2(-beg+cdg+cef)\left(d(-be+2cd)+e(-be+2cd)\,x\right)}{3c\,e^2\left(-be+2cd\right)^2\left(d\left(-be+cd\right)-b\,e^2x-c\,e^2x^2\right)^{\frac{3}{2}}}$$
$$+\frac{2(-beg-2cdg+4cef)\left(2cx+b\right)}{3ce\left(-be+2cd\right)^3\sqrt{d\left(-be+cd\right)-b\,e^2x-c\,e^2x^2}}$$

command

```
integrate((e*x+d)*(g*x+f)/(-c*e^2*x^2-b*e^2*x-b*d*e+c*d^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$2\sqrt{-cx^2e^2+cd^2-bxe^2-bde}\left(\left(\left(\frac{2\left(4c^3d^2ge^3-8c^3dfe^4+4bc^2fe^5-b^2cge^5\right)x}{16c^4d^4e^2-32bc^3d^3e^3+24b^2c^2d^2e^4-8b^3cde^5+b^4e^6}+\frac{3\left(4bc^2d^2ge^3-8bc^2dfe^4+4b^2cfe^5-b^3ge\right.\right.\right.\right.$$

11 Test file number 35

Test folder name:

`test_cases/1_Algebraic_functions/1.2_Trinomial_products/1.2.1_Quadratic/35_1.2.1.4-d+e_x-^m-f+g_x-^n-a+b_x+c_x^2-^p`

11.1 Problem number 18

$$\int \frac{x^2(d+ex)}{(d^2-e^2x^2)^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{x^2(ex+d)}{3de\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{2}{3e^3\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^2*(e*x+d)/(-e^2*x^2+d^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(x^2\left(\frac{x}{d}+3\,e^{(-1)}\right)-2\,d^2e^{(-3)}\right)\sqrt{-x^2e^2+d^2}}{3\left(x^2e^2-d^2\right)^2}$$

11.2 Problem number 19

$$\int \frac{x^7(d+ex)}{(d^2-e^2x^2)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{x^6(ex+d)}{5e^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{x^4(7ex+6d)}{15e^4\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{7d^2\arctan\left(\frac{ex}{\sqrt{-e^2x^2+d^2}}\right)}{2e^8}$$
$$+\frac{x^2(35ex+24d)}{15e^6\sqrt{-e^2x^2+d^2}}+\frac{(35ex+32d)\sqrt{-e^2x^2+d^2}}{10e^8}$$

command

`integrate(x^7*(e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{7}{2}\,d^2\arcsin\left(\frac{xe}{d}\right)e^{(-8)}\mathrm{sgn}(d)$$
$$-\frac{\left(96\,d^7e^{(-8)}+\left(105\,d^6e^{(-7)}-\left(240\,d^5e^{(-6)}+\left(245\,d^4e^{(-5)}-\left(180\,d^3e^{(-4)}+\left(161\,d^2e^{(-3)}-15\left(xe^{(-1)}+2\,de^{(-2)}\right)x\right.\right.\right.\right.\right.}{30\left(x^2e^2-d^2\right)^3}$$

11.3 Problem number 20

$$\int \frac{x^6(d+ex)}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{x^5(ex+d)}{5e^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{x^3(6ex+5d)}{15e^4\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{d\arctan\left(\frac{ex}{\sqrt{-e^2x^2+d^2}}\right)}{e^7}$$
$$+\frac{x(8ex+5d)}{5e^6\sqrt{-e^2x^2+d^2}}+\frac{16\sqrt{-e^2x^2+d^2}}{5e^7}$$

command

`integrate(x^6*(e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-d\arcsin\left(\frac{xe}{d}\right)e^{(-7)}\mathrm{sgn}(d)$$
$$-\frac{\left(48\,d^6e^{(-7)}+\left(15\,d^5e^{(-6)}-\left(120\,d^4e^{(-5)}+\left(35\,d^3e^{(-4)}-\left(90\,d^2e^{(-3)}-\left(15\,xe^{(-1)}-23\,de^{(-2)}\right)x\right)x\right)x\right)x\right)x\right)\sqrt{-x^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.4 Problem number 21

$$\int \frac{x^5(d+ex)}{(d^2-e^2x^2)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{x^4(ex+d)}{5e^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{x^2(5ex+4d)}{15e^4\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{\arctan\left(\frac{ex}{\sqrt{-e^2x^2+d^2}}\right)}{e^6}+\frac{15ex+8d}{15e^6\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^5*(e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\arcsin\left(\frac{xe}{d}\right)e^{(-6)}\mathrm{sgn}(d)$$
$$-\frac{\left(8\,d^5e^{(-6)}+\left(15\,d^4e^{(-5)}-\left(20\,d^3e^{(-4)}+\left(35\,d^2e^{(-3)}-\left(23\,xe^{(-1)}+15\,de^{(-2)}\right)x\right)x\right)x\right)x\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.5 Problem number 22

$$\int \frac{x^4(d+ex)}{(d^2-e^2x^2)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{x^4(ex+d)}{5de\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{4d^2}{15e^5\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{4}{5e^5\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^4*(e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(8\,d^4e^{(-5)}+\left(3\,x^2\left(\frac{x}{d}+5\,e^{(-1)}\right)-20\,d^2e^{(-3)}\right)x^2\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.6 Problem number 23

$$\int \frac{x^3(d+ex)}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{x^2(ex+d)}{5e^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{-3ex-2d}{15e^4\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{x}{5d^2e^3\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^3*(e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(2\,d^3e^{(-4)}-\left(\frac{3\,x^3e}{d^2}+5\,de^{(-2)}\right)x^2\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.7 Problem number 24

$$\int \frac{x^2(d+ex)}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{x^2(ex+d)}{5de\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{2(-ex+d)}{15d\,e^3\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{2x}{15d^3e^2\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^2*(e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\left(x\left(\frac{2\,x^2e^2}{d^3}-\frac{5}{d}\right)-5\,e^{(-1)}\right)x^2+2\,d^2e^{(-3)}\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.8 Problem number 25

$$\int \frac{x(d+ex)}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{ex+d}{5e^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{x}{15d^2e\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{2x}{15d^4e\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x*(e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(x^3\left(\frac{2x^2e^3}{d^4}-\frac{5e}{d^2}\right)-3de^{(-2)}\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.9 Problem number 26

$$\int \frac{d+ex}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{ex+d}{5de\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{4x}{15d^3\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{8x}{15d^5\sqrt{-e^2x^2+d^2}}$$

command

```
integrate((e*x+d)/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(4x^2\left(\frac{2x^2e^4}{d^5}-\frac{5e^2}{d^3}\right)+\frac{15}{d}\right)x+3e^{(-1)}\right)}{15\left(x^2e^2-d^2\right)^3}$$

11.10 Problem number 27

$$\int \frac{d+ex}{x\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{ex+d}{5d^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{4ex+5d}{15d^4\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{d^6}+\frac{8ex+15d}{15d^6\sqrt{-e^2x^2+d^2}}$$

command

```
integrate((e*x+d)/x/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(\left(\left(x\left(\frac{8xe^5}{d^6}+\frac{15e^4}{d^5}\right)-\frac{20e^3}{d^4}\right)x-\frac{35e^2}{d^3}\right)x+\frac{15e}{d^2}\right)x+\frac{23}{d}\right)}{15\left(x^2e^2-d^2\right)^3}$$
$$-\frac{\log\left(\frac{\left|-2de-2\sqrt{-x^2e^2+d^2}e\right|e^{(-2)}}{2|x|}\right)}{d^6}$$

11.11 Problem number 28

$$\int \frac{d+ex}{x^2\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{ex+d}{5d^2x\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{5ex+6d}{15d^4x\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}$$
$$-\frac{e\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{d^7}+\frac{5ex+8d}{5d^6x\sqrt{-e^2x^2+d^2}}-\frac{16\sqrt{-e^2x^2+d^2}}{5d^7x}$$

command

```
integrate((e*x+d)/x^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(\left(3\left(x\left(\frac{11xe^6}{d^7}+\frac{5e^5}{d^6}\right)-\frac{25e^4}{d^5}\right)x-\frac{35e^3}{d^4}\right)x+\frac{45e^2}{d^3}\right)x+\frac{23e}{d^2}\right)}{15\left(x^2e^2-d^2\right)^3}$$
$$-\frac{e\log\left(\frac{\left|-2de-2\sqrt{-x^2e^2+d^2}\,e\right|e^{(-2)}}{2|x|}\right)}{d^7}$$
$$+\frac{xe^3}{2\left(de+\sqrt{-x^2e^2+d^2}\,e\right)d^7}-\frac{\left(de+\sqrt{-x^2e^2+d^2}\,e\right)e^{(-1)}}{2d^7x}$$

11.12 Problem number 29

$$\int\frac{d+ex}{x^3\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{ex+d}{5d^2x^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{6ex+7d}{15d^4x^2\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{7e^2\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{2d^8}$$
$$+\frac{24ex+35d}{15d^6x^2\sqrt{-e^2x^2+d^2}}-\frac{7\sqrt{-e^2x^2+d^2}}{2d^7x^2}-\frac{16e\sqrt{-e^2x^2+d^2}}{5d^8x}$$

command

```
integrate((e*x+d)/x^3/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(\left(3\left(x\left(\frac{11xe^7}{d^8}+\frac{15e^6}{d^7}\right)-\frac{25e^5}{d^6}\right)x-\frac{100e^4}{d^5}\right)x+\frac{45e^3}{d^4}\right)x+\frac{58e^2}{d^3}\right)}{15\left(x^2e^2-d^2\right)^3}$$
$$-\frac{7e^2\log\left(\frac{\left|-2de-2\sqrt{-x^2e^2+d^2}\,e\right|e^{(-2)}}{2|x|}\right)}{2d^8}+\frac{x^2\left(\frac{4\left(de+\sqrt{-x^2e^2+d^2}\,e\right)e^4}{x}+e^6\right)}{8\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^2d^8}$$
$$-\frac{\left(\frac{4\left(de+\sqrt{-x^2e^2+d^2}\,e\right)d^8e^8}{x}+\frac{\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^2d^8e^6}{x^2}\right)e^{(-8)}}{8d^{16}}$$

11.13 Problem number 30

$$\int \frac{x^2(d+ex)}{\left(d^2-e^2x^2\right)^{9/2}}\,dx$$

Optimal antiderivative

$$\frac{x^2(ex+d)}{7de\left(-e^2x^2+d^2\right)^{\frac{7}{2}}}-\frac{2(-2ex+d)}{35de^3\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{4x}{105d^3e^2\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{8x}{105d^5e^2\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^2*(e*x+d)/(-e^2*x^2+d^2)^(9/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\left(\left(4x^2\left(\frac{2x^2e^4}{d^5}-\frac{7e^2}{d^3}\right)+\frac{35}{d}\right)x+21e^{(-1)}\right)x^2-6d^2e^{(-3)}\right)\sqrt{-x^2e^2+d^2}}{105\left(x^2e^2-d^2\right)^4}$$

11.14 Problem number 31

$$\int \frac{x^2(d+ex)}{\left(d^2-e^2x^2\right)^{11/2}}\,dx$$

Optimal antiderivative

$$\frac{x^2(ex+d)}{9de\left(-e^2x^2+d^2\right)^{\frac{9}{2}}}-\frac{2(-3ex+d)}{63de^3\left(-e^2x^2+d^2\right)^{\frac{7}{2}}}-\frac{2x}{105d^3e^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}$$
$$-\frac{8x}{315d^5e^2\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{16x}{315d^7e^2\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^2*(e*x+d)/(-e^2*x^2+d^2)^(11/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\left(\left(2\left(4x^2\left(\frac{2x^2e^6}{d^7}-\frac{9e^4}{d^5}\right)+\frac{63e^2}{d^3}\right)x^2-\frac{105}{d}\right)x-45e^{(-1)}\right)x^2+10d^2e^{(-3)}\right)\sqrt{-x^2e^2+d^2}}{315\left(x^2e^2-d^2\right)^5}$$

11.15 Problem number 44

$$\int \frac{x^5(d+ex)^2}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{d^4(ex+d)^2}{5e^6\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{22d^3(ex+d)}{15e^6\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{2d\arctan\left(\frac{ex}{\sqrt{-e^2x^2+d^2}}\right)}{e^6}$$
$$+\frac{2d(23ex+30d)}{15e^6\sqrt{-e^2x^2+d^2}}+\frac{\sqrt{-e^2x^2+d^2}}{e^6}$$

command

```
integrate(x^5*(e*x+d)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-2\,d\arcsin\left(\frac{xe}{d}\right)e^{(-6)}\mathrm{sgn}(d)$$
$$-\frac{\left(56\,d^6e^{(-6)}+\left(30\,d^5e^{(-5)}-\left(140\,d^4e^{(-4)}+\left(70\,d^3e^{(-3)}-\left(105\,d^2e^{(-2)}+\left(46\,de^{(-1)}-15\,x\right)x\right)x\right)x\right)x\right)x\right)\sqrt{-x^2e^2+}}{15\left(x^2e^2-d^2\right)^3}$$

11.16 Problem number 45

$$\int \frac{x^4(d+ex)^2}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{d^3(ex+d)^2}{5e^5\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{17d^2(ex+d)}{15e^5\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{\arctan\left(\frac{ex}{\sqrt{-e^2x^2+d^2}}\right)}{e^5}+\frac{\frac{26ex}{15}+2d}{e^5\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^4*(e*x+d)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\arcsin\left(\frac{xe}{d}\right)e^{(-5)}\mathrm{sgn}(d)$$
$$-\frac{\left(16\,d^5e^{(-5)}+\left(15\,d^4e^{(-4)}-\left(40\,d^3e^{(-3)}+\left(35\,d^2e^{(-2)}-2\left(15\,de^{(-1)}+13\,x\right)x\right)x\right)x\right)x\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.17 Problem number 46

$$\int \frac{x^3(d+ex)^2}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{d^2(ex+d)^2}{5e^4\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{4d(ex+d)}{5e^4\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{2ex+5d}{5d\,e^4\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^3*(e*x+d)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(2\,d^4e^{(-4)}+\left(x^2\left(\frac{2\,xe}{d}+5\right)-5\,d^2e^{(-2)}\right)x^2\right)\sqrt{-x^2e^2+d^2}}{5\left(x^2e^2-d^2\right)^3}$$

11.18 Problem number 47

$$\int \frac{x^2(d+ex)^2}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{d(ex+d)^2}{5e^3\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{7(ex+d)}{15e^3\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{x}{15d^2e^2\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^2*(e*x+d)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(4\,d^3e^{(-3)}-\left(x\left(\frac{x^2e^2}{d^2}+5\right)+10\,de^{(-1)}\right)x^2\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.19 Problem number 48

$$\int \frac{x(d+ex)^2}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{(ex+d)^2}{5e^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{2(ex+d)}{15d\,e^2\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{4x}{15d^3e\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x*(e*x+d)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\left(2\,x\left(\frac{2\,x^2e^3}{d^3}-\frac{5\,e}{d}\right)-5\right)x^2-d^2e^{(-2)}\right)\sqrt{-x^2e^2+d^2}}{15\left(x^2e^2-d^2\right)^3}$$

11.20 Problem number 49

$$\int \frac{(d+ex)^2}{\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{\frac{2ex}{5}+\frac{2d}{5}}{e\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{x}{5d^2\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}+\frac{2x}{5d^4\sqrt{-e^2x^2+d^2}}$$

command

```
integrate((e*x+d)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(x^2\left(\frac{2\,x^2e^4}{d^4}-\frac{5\,e^2}{d^2}\right)+5\right)x+2\,de^{(-1)}\right)}{5\left(x^2e^2-d^2\right)^3}$$

11.21 Problem number 50

$$\int \frac{(d+ex)^2}{x\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{\frac{2ex}{5}+\frac{2d}{5}}{d\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{8ex+5d}{15d^3\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{d^5}+\frac{16ex+15d}{15d^5\sqrt{-e^2x^2+d^2}}$$

command

```
integrate((e*x+d)^2/x/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(\left(\left(x\left(\frac{16\,xe^5}{d^5}+\frac{15\,e^4}{d^4}\right)-\frac{40\,e^3}{d^3}\right)x-\frac{35\,e^2}{d^2}\right)x+\frac{30\,e}{d}\right)x+26\right)}{15\left(x^2e^2-d^2\right)^3}$$

$$-\frac{\log\left(\frac{\left|-2\,de-2\sqrt{-x^2e^2+d^2}\,e\right|e^{(-2)}}{2\,|x|}\right)}{d^5}$$

11.22 Problem number 51

$$\int \frac{(d+ex)^2}{x^2\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{2e(ex+d)}{5d^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{e(13ex+10d)}{15d^4\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}$$
$$-\frac{2e\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{d^6}+\frac{e(41ex+30d)}{15d^6\sqrt{-e^2x^2+d^2}}-\frac{\sqrt{-e^2x^2+d^2}}{d^6x}$$

command

```
integrate((e*x+d)^2/x^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(\left(\left(x\left(\frac{41\,xe^6}{d^6}+\frac{30\,e^5}{d^5}\right)-\frac{95\,e^4}{d^4}\right)x-\frac{70\,e^3}{d^3}\right)x+\frac{60\,e^2}{d^2}\right)x+\frac{46\,e}{d}\right)}{15\left(x^2e^2-d^2\right)^3}$$
$$-\frac{2\,e\log\left(\frac{\left|-2\,de-2\sqrt{-x^2e^2+d^2}\,e\right|e^{(-2)}}{2\,|x|}\right)}{d^6}$$
$$+\frac{xe^3}{2\left(de+\sqrt{-x^2e^2+d^2}\,e\right)d^6}-\frac{\left(de+\sqrt{-x^2e^2+d^2}\,e\right)e^{(-1)}}{2\,d^6x}$$

11.23 Problem number 52

$$\int \frac{(d+ex)^2}{x^3\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{2e^2(ex+d)}{5d^3\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{e^2(6ex+5d)}{5d^5\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{9e^2\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{2d^7}$$
$$+\frac{2e^2(11ex+10d)}{5d^7\sqrt{-e^2x^2+d^2}}-\frac{\sqrt{-e^2x^2+d^2}}{2d^6x^2}-\frac{2e\sqrt{-e^2x^2+d^2}}{d^7x}$$

command

```
integrate((e*x+d)^2/x^3/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(\left(2\left(x\left(\frac{11\,xe^7}{d^7}+\frac{10\,e^6}{d^6}\right)-\frac{25\,e^5}{d^5}\right)x-\frac{45\,e^4}{d^4}\right)x+\frac{30\,e^3}{d^3}\right)x+\frac{27\,e^2}{d^2}\right)}{5\left(x^2e^2-d^2\right)^3}$$
$$-\frac{9\,e^2\log\left(\frac{\left|-2\,de-2\sqrt{-x^2e^2+d^2}\,e\right|e^{(-2)}}{2\,|x|}\right)}{2\,d^7}+\frac{x^2\left(\frac{8\left(de+\sqrt{-x^2e^2+d^2}\,e\right)e^4}{x}+e^6\right)}{8\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^2d^7}$$
$$-\frac{\left(\frac{8\left(de+\sqrt{-x^2e^2+d^2}\,e\right)d^7e^8}{x}+\frac{\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^2d^7e^6}{x^2}\right)e^{(-8)}}{8\,d^{14}}$$

11.24 Problem number 53

$$\int\frac{(d+ex)^2}{x^4\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{2e^3(ex+d)}{5d^4\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}+\frac{e^3(23ex+20d)}{15d^6\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}-\frac{7e^3\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{d^8}$$
$$+\frac{2e^3(53ex+45d)}{15d^8\sqrt{-e^2x^2+d^2}}-\frac{\sqrt{-e^2x^2+d^2}}{3d^6x^3}-\frac{e\sqrt{-e^2x^2+d^2}}{d^7x^2}-\frac{14e^2\sqrt{-e^2x^2+d^2}}{3d^8x}$$

command

```
integrate((e*x+d)^2/x^4/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{-x^2e^2+d^2}\left(\left(\left(\left(2x\left(\frac{53xe^8}{d^8}+\frac{45e^7}{d^7}\right)-\frac{235e^6}{d^6}\right)x-\frac{200e^5}{d^5}\right)x+\frac{135e^4}{d^4}\right)x+\frac{116e^3}{d^3}\right)}{15\left(x^2e^2-d^2\right)^3}$$
$$+\frac{x^3\left(\frac{6\left(de+\sqrt{-x^2e^2+d^2}\,e\right)e^6}{x}+\frac{57\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^2e^4}{x^2}+e^8\right)e}{24\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^3d^8}$$
$$-\frac{7e^3\log\left(\frac{\left|-2de-2\sqrt{-x^2e^2+d^2}\,e\right|e^{(-2)}}{2|x|}\right)}{d^8}$$
$$-\frac{\left(\frac{57\left(de+\sqrt{-x^2e^2+d^2}\,e\right)d^{16}e^{16}}{x}+\frac{6\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^2d^{16}e^{14}}{x^2}+\frac{\left(de+\sqrt{-x^2e^2+d^2}\,e\right)^3d^{16}e^{12}}{x^3}\right)e^{(-15)}}{24d^{24}}$$

11.25 Problem number 130

$$\int \frac{x^2}{(d+ex)\left(d^2-e^2x^2\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{3e^3\sqrt{-e^2x^2+d^2}}-\frac{x^2}{3de\,(ex+d)\sqrt{-e^2x^2+d^2}}$$

command

```
integrate(x^2/(e*x+d)/(-e^2*x^2+d^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$+\infty$$

11.26 Problem number 134

$$\int \frac{1}{x^2(d+ex)\left(d^2-e^2x^2\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{e\operatorname{arctanh}\left(\frac{\sqrt{-e^2x^2+d^2}}{d}\right)}{d^5}+\frac{-3ex+4d}{3d^4x\sqrt{-e^2x^2+d^2}}+\frac{1}{3d^2x\left(ex+d\right)\sqrt{-e^2x^2+d^2}}-\frac{8\sqrt{-e^2x^2+d^2}}{3d^5x}$$

command

```
integrate(1/x^2/(e*x+d)/(-e^2*x^2+d^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$+\infty$$

11.27 Problem number 586

$$\int \frac{(d+ex)^3}{(f+gx)^2\left(d^2-e^2x^2\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}&\frac{4de(ex+d)}{5\left(dg+ef\right)^2\left(-e^2x^2+d^2\right)^{\frac{5}{2}}}-\frac{e(5d(-3dg+ef)-e(21dg+ef)\,x)}{15d\left(dg+ef\right)^3\left(-e^2x^2+d^2\right)^{\frac{3}{2}}}\\&+\frac{e\,g^3(-3dg+4ef)\arctan\left(\frac{e^2fx+d^2g}{\sqrt{-d^2g^2+e^2f^2}\sqrt{-e^2x^2+d^2}}\right)}{(-dg+ef)\left(dg+ef\right)^4\sqrt{-d^2g^2+e^2f^2}}\\&+\frac{e\left(45d^3g^2+e\left(57d^2g^2+14defg+2e^2f^2\right)x\right)}{15d^3\left(dg+ef\right)^4\sqrt{-e^2x^2+d^2}}+\frac{g^4\sqrt{-e^2x^2+d^2}}{(-dg+ef)\left(dg+ef\right)^4(gx+f)}\end{aligned}$$

command

```
integrate((e*x+d)^3/(g*x+f)^2/(-e^2*x^2+d^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

output too large to display

11.28 Problem number 842

$$\int \frac{\sqrt{d+ex}\,\left(a+bx+cx^2\right)}{(e+fx)^{3/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{\left(4ef\left(-2aef-bdf+3be^2\right)-c\left(-d^2f^2-6de^2f+15e^4\right)\right)\operatorname{arctanh}\left(\frac{\sqrt{f}\,\sqrt{ex+d}}{\sqrt{e}\,\sqrt{fx+e}}\right)}{4e^{\frac{3}{2}}f^{\frac{7}{2}}}\\
&+\frac{2\left(a+\frac{e(-bf+ce)}{f^2}\right)(ex+d)^{\frac{3}{2}}}{(-df+e^2)\sqrt{fx+e}}+\frac{c(ex+d)^{\frac{3}{2}}\sqrt{fx+e}}{2ef^2}\\
&+\frac{\left(4ef\left(-2aef-bdf+3be^2\right)-c\left(-d^2f^2-6de^2f+15e^4\right)\right)\sqrt{ex+d}\,\sqrt{fx+e}}{4ef^3(-df+e^2)}
\end{aligned}$$

command

```
integrate((e*x+d)^(1/2)*(c*x^2+b*x+a)/(f*x+e)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned}
&\frac{\left((xe+d)\left(\frac{2(xe+d)ce^{(-1)}}{f}-\frac{(3cdf^4e^2-4bf^4e^3+5cf^3e^4)e^{(-3)}}{f^5}\right)+\frac{(cd^2f^4e^2-4bdf^4e^3+6cdf^3e^4-8af^4e^4+12bf^3e^5-15cf^2e^6)e^{(-3)}}{f^5}\right)\sqrt{xe}\\
&\qquad 4\sqrt{(xe+d)fe-dfe+e^3}\\
&+\frac{\left(cd^2f^2-4bdf^2e+6cdfe^2-8af^2e^2+12bfe^3-15ce^4\right)e^{\left(-\frac{3}{2}\right)}\log\left(\left|-\sqrt{xe+d}\,\sqrt{f}\,e^{\frac{1}{2}}+\sqrt{(xe+d)fe-dfe+e}\right.\right.}{4f^{\frac{7}{2}}}
\end{aligned}$$

12 Test file number 39

Test folder name:

```
test_cases/1_Algebraic_functions/1.2_Trinomial_products/1.2.2_Quartic/39_1.2.2.2-d_x-
^m-a+b_x^2+c_x^4-^p
```

12.1 Problem number 3

$$\int \frac{1}{\sqrt[4]{a^2+2abx^2+b^2x^4}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arcsinh}\left(\frac{x\sqrt{b}}{\sqrt{a}}\right)\sqrt{a}\,\sqrt{1+\frac{b\,x^2}{a}}}{\left(b^2x^4+2ab\,x^2+a^2\right)^{\frac{1}{4}}\sqrt{b}}$$

command

```
integrate(1/(b^2*x^4+2*a*b*x^2+a^2)^(1/4),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\arctan\left(\frac{\sqrt{-\frac{bx^2+a}{x^2}}}{\sqrt{b}}\right)}{\sqrt{b}}$$

12.2 Problem number 4

$$\int \frac{1}{\left(a^2+2abx^2+b^2x^4\right)^{3/4}}\,dx$$

Optimal antiderivative

$$\frac{x\left(b\,x^2+a\right)}{a\left(b^2x^4+2ab\,x^2+a^2\right)^{\frac{3}{4}}}$$

command

```
integrate(1/(b^2*x^4+2*a*b*x^2+a^2)^(3/4),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{a\sqrt{-\frac{bx^2+a}{x^2}}}$$

13 Test file number 51

Test folder name:
`test_cases/1_Algebraic_functions/1.3_Miscellaneous/51_1.3.1_Rational_functions`

13.1 Problem number 163

$$\int x^{14(-1+n)}(b+2cx^n)\left(bx+cx^{1+n}\right)^{13}\,dx$$

Optimal antiderivative

$$\frac{x^{14n}(b+c\,x^n)^{14}}{14n}$$

command

```
integrate(x^(-14+14*n)*(b+2*c*x^n)*(b*x+c*x^(1+n))^13,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{c^{14}x^{28\,n}+14\,bc^{13}x^{27\,n}+91\,b^2c^{12}x^{26\,n}+364\,b^3c^{11}x^{25\,n}+1001\,b^4c^{10}x^{24\,n}+2002\,b^5c^9x^{23\,n}+3003\,b^6c^8x^{22\,n}+3432\,b^7}{14}$$

14 Test file number 55

Test folder name:
`test_cases/2_Exponentials/55_2.3_Exponential_functions`

14.1 Problem number 744

$$\int\left(\frac{1}{\sqrt{e^x+x}}+\frac{e^x}{\sqrt{e^x+x}}\right)\,dx$$

Optimal antiderivative

$$2\sqrt{x+\mathrm{e}^x}$$

command

```
integrate(exp(x)/(exp(x)+x)^(1/2)+1/(exp(x)+x)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$2\,\sqrt{x+e^x}$$

15 Test file number 59

Test folder name:

`test_cases/3_Logarithms/59_3.2.1-f+g_x-^m-A+B_log-e-a+b_x-over-c+d_x-^n-^p`

15.1 Problem number 201

$$\int (ag+bgx)^4 \left(A+B\log\left(\frac{e(c+dx)^2}{(a+bx)^2}\right)\right)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{2B(-ad+bc)^4\,g^4x}{5d^4}+\frac{B(-ad+bc)^3\,g^4(bx+a)^2}{5b\,d^3}\\
&-\frac{2B(-ad+bc)^2\,g^4(bx+a)^3}{15b\,d^2}+\frac{B(-ad+bc)\,g^4(bx+a)^4}{10bd}\\
&+\frac{2B(-ad+bc)^5\,g^4\ln(dx+c)}{5b\,d^5}+\frac{g^4(bx+a)^5\left(A+B\ln\left(\frac{e(dx+c)^2}{(bx+a)^2}\right)\right)}{5b}
\end{aligned}$$

command

```
integrate((b*g*x+a*g)^4*(A+B*log(e*(d*x+c)^2/(b*x+a)^2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned}
&-\frac{2\,Ba^5g^4\log(bx+a)}{5\,b}+\frac{1}{5}\left(Ab^4g^4+Bb^4g^4\right)x^5+\frac{\left(Bb^4cg^4+10\,Aab^3dg^4+9\,Bab^3dg^4\right)x^4}{10\,d}\\
&-\frac{2\left(Bb^4c^2g^4-5\,Bab^3cdg^4-15\,Aa^2b^2d^2g^4-11\,Ba^2b^2d^2g^4\right)x^3}{15\,d^2}\\
&+\frac{1}{5}\left(Bb^4g^4x^5+5\,Bab^3g^4x^4+10\,Ba^2b^2g^4x^3+10\,Ba^3bg^4x^2+5\,Ba^4g^4x\right)\log\left(\frac{d^2x^2+2\,cdx+c^2}{b^2x^2+2\,abx+a^2}\right)\\
&+\frac{\left(Bb^4c^3g^4-5\,Bab^3c^2dg^4+10\,Ba^2b^2cd^2g^4+10\,Aa^3bd^3g^4+4\,Ba^3bd^3g^4\right)x^2}{5\,d^3}\\
&-\frac{\left(2\,Bb^4c^4g^4-10\,Bab^3c^3dg^4+20\,Ba^2b^2c^2d^2g^4-20\,Ba^3bcd^3g^4-5\,Aa^4d^4g^4+3\,Ba^4d^4g^4\right)x}{5\,d^4}\\
&+\frac{2\left(Bb^4c^5g^4-5\,Bab^3c^4dg^4+10\,Ba^2b^2c^3d^2g^4-10\,Ba^3bc^2d^3g^4+5\,Ba^4cd^4g^4\right)\log(dx+c)}{5\,d^5}
\end{aligned}$$

15.2 Problem number 263

$$\int (f+gx)^3 \left(A+B\log\left(\frac{e(a+bx)^2}{(c+dx)^2}\right)\right)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{B(-ad+bc)\,g\left(a^2d^2g^2-abdg(-cg+4df)+b^2\left(c^2g^2-4cdfg+6d^2f^2\right)\right)x}{2b^3d^3}\\
&-\frac{B(-ad+bc)\,g^2(-adg-bcg+4bdf)\,x^2}{4b^2d^2}-\frac{B(-ad+bc)\,g^3x^3}{6bd}\\
&-\frac{B(-ag+bf)^4\ln(bx+a)}{2b^4g}+\frac{(gx+f)^4\left(A+B\ln\left(\frac{e(bx+a)^2}{(dx+c)^2}\right)\right)}{4g}+\frac{B(-cg+df)^4\ln(dx+c)}{2d^4g}
\end{aligned}$$

command

```
integrate((g*x+f)^3*(A+B*log(e*(b*x+a)^2/(d*x+c)^2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned}
&\frac{1}{4}\left(Ag^3+Bg^3\right)x^4+\frac{\left(6\,Abdfg^2+6\,Bbdfg^2-Bbcg^3+Badg^3\right)x^3}{6\,bd}\\
&+\frac{1}{4}\left(Bg^3x^4+4\,Bfg^2x^3+6\,Bf^2gx^2+4\,Bf^3x\right)\log\left(\frac{b^2x^2+2\,abx+a^2}{d^2x^2+2\,cdx+c^2}\right)\\
&+\frac{\left(6\,Ab^2d^2f^2g+6\,Bb^2d^2f^2g-4\,Bb^2cdfg^2+4\,Babd^2fg^2+Bb^2c^2g^3-Ba^2d^2g^3\right)x^2}{4\,b^2d^2}\\
&+\frac{\left(4\,Bab^3f^3-6\,Ba^2b^2f^2g+4\,Ba^3bfg^2-Ba^4g^3\right)\log\left(bx+a\right)}{2\,b^4}\\
&-\frac{\left(4\,Bcd^3f^3-6\,Bc^2d^2f^2g+4\,Bc^3dfg^2-Bc^4g^3\right)\log\left(-dx-c\right)}{2\,d^4}\\
&+\frac{\left(2\,Ab^3d^3f^3+2\,Bb^3d^3f^3-6\,Bb^3cd^2f^2g+6\,Bab^2d^3f^2g+4\,Bb^3c^2dfg^2-4\,Ba^2bd^3fg^2-Bb^3c^3g^3+Ba^3d^3g^3\right)x}{2\,b^3d^3}
\end{aligned}$$

15.3 Problem number 295

$$\int (g+hx)^2 \left(A+B\log\left(e(a+bx)^n(c+dx)^{-n}\right)\right)\,dx$$

Optimal antiderivative

$$-\frac{B(-ad+bc)\,h(-adh-bch+3bdg)\,nx}{3b^2d^2}-\frac{B(-ad+bc)\,h^2nx^2}{6bd}-\frac{B(-ah+bg)^3\,n\ln(bx+a)}{3b^3h}+\frac{B(-ch+dg)^3\,n\ln(dx+c)}{3d^3h}+\frac{(hx+g)^3\left(A+B\ln\left(e(bx+a)^n(dx+c)^{-n}\right)\right)}{3h}$$

command

```
integrate((h*x+g)^2*(A+B*log(e*(b*x+a)^n/((d*x+c)^n))),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned}&\frac{1}{3}\left(Ah^2+Bh^2\right)x^3+\frac{1}{3}\left(Bh^2nx^3+3\,Bghnx^2+3\,Bg^2nx\right)\log\left(bx+a\right)\\&-\frac{1}{3}\left(Bh^2nx^3+3\,Bghnx^2+3\,Bg^2nx\right)\log\left(dx+c\right)\\&-\frac{\left(Bbch^2n-Badh^2n-6\,Abdgh-6\,Bbdgh\right)x^2}{6\,bd}\\&+\frac{\left(3\,Bab^2g^2n-3\,Ba^2bghn+Ba^3h^2n\right)\log\left(bx+a\right)}{3\,b^3}\\&-\frac{\left(3\,Bcd^2g^2n-3\,Bc^2dghn+Bc^3h^2n\right)\log\left(-dx-c\right)}{3\,d^3}\\&-\frac{\left(3\,Bb^2cdghn-3\,Babd^2ghn-Bb^2c^2h^2n+Ba^2d^2h^2n-3\,Ab^2d^2g^2-3\,Bb^2d^2g^2\right)x}{3\,b^2d^2}\end{aligned}$$

16 Test file number 61

Test folder name:

```
test_cases/3_Logarithms/61_3.2.3_u_log-e-f-a+b_x-^p-c+d_x-^q-^r-^s
```

16.1 Problem number 27

$$\int (g+hx)^2 \log\left(e(f(a+bx)^p(c+dx)^q)^r\right)\,dx$$

Optimal antiderivative

$$-\frac{(-ah+bg)^2 prx}{3b^2} - \frac{(-ch+dg)^2 qrx}{3d^2} - \frac{(-ah+bg)\,pr(hx+g)^2}{6bh} - \frac{(-ch+dg)\,qr(hx+g)^2}{6dh} - \frac{pr(hx+g)^3}{9h} - \frac{qr(hx+g)^3}{9h} - \frac{(-ah+bg)^3 pr\ln(bx+a)}{3b^3h} - \frac{(-ch+dg)^3 qr\ln(dx+c)}{3d^3h} + \frac{(hx+g)^3\ln(e(f(bx+a)^p(dx+c)^q)^r)}{3h}$$

command

```
integrate((h*x+g)^2*log(e*(f*(b*x+a)^p*(d*x+c)^q)^r),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{9}\left(h^2pr+h^2qr-3h^2r\log(f)-3h^2\right)x^3+\frac{1}{3}\left(h^2prx^3+3ghprx^2+3g^2prx\right)\log(bx+a)+\frac{1}{3}\left(h^2qrx^3+3ghqrx^2+3g^2qrx\right)\log(dx+c)-\frac{\left(3bdghpr-adh^2pr+3bdghqr-bch^2qr-6bdghr\log(f)-6bdgh\right)x^2}{6bd}+\frac{\left(3ab^2g^2pr-3a^2bghpr+a^3h^2pr\right)\log(bx+a)}{3b^3}+\frac{\left(3cd^2g^2qr-3c^2dghqr+c^3h^2qr\right)\log(-dx-c)}{3d^3}-\frac{\left(3b^2d^2g^2pr-3abd^2ghpr+a^2d^2h^2pr+3b^2d^2g^2qr-3b^2cdghqr+b^2c^2h^2qr-3b^2d^2g^2r\log(f)-3b^2d^2g^2\right)x}{3b^2d^2}$$

17 Test file number 64

Test folder name:

```
test_cases/3_Logarithms/64_3.5_Logarithm_functions
```

17.1 Problem number 111

$$\int \frac{\log\left(-1+4x+4\sqrt{(-1+x)x}\right)}{x^{3/2}}\,dx$$

Optimal antiderivative

$$-8\arctan\left(\frac{\sqrt{x}}{\sqrt{x^2-x}}\right)+4\arctan\left(2\sqrt{2}\,\sqrt{x}\right)\sqrt{2}$$
$$-\frac{2\ln\left(-1+4x+4\sqrt{x^2-x}\right)}{\sqrt{x}}-\frac{4\arctan\left(\frac{2\sqrt{-1+x}\,\sqrt{2}}{3}\right)\sqrt{x^2-x}\,\sqrt{2}}{\sqrt{-1+x}\,\sqrt{x}}$$

command

```
integrate(log(-1+4*x+4*((-1+x)*x)^(1/2))/x^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: NotImplementedError

Giac 1.7.0 via sagemath 9.3 output

$$2\sqrt{2}\,\pi i-4\,\pi i+4\,\pi\mathrm{sgn}\left(\sqrt{x-1}-\sqrt{x}\right)$$
$$-2\sqrt{2}\left(\pi\mathrm{sgn}\left(\sqrt{x-1}-\sqrt{x}\right)+2\arctan\left(\frac{\sqrt{2}\left(\left(\sqrt{x-1}-\sqrt{x}\right)^2-1\right)}{3\left(\sqrt{x-1}-\sqrt{x}\right)}\right)\right)$$
$$+4\sqrt{2}\arctan\left(\frac{2}{3}\sqrt{2}\,i\right)+4\sqrt{2}\arctan\left(2\sqrt{2}\,\sqrt{x}\right)$$
$$-\frac{2\log\left(4x+4\sqrt{(x-1)x}-1\right)}{\sqrt{x}}-8\arctan\left(i\right)+8\arctan\left(\frac{\left(\sqrt{x-1}-\sqrt{x}\right)^2-1}{2\left(\sqrt{x-1}-\sqrt{x}\right)}\right)$$

17.2 Problem number 185

$$\int \cos(a+bx)\log\left(\cos\left(\frac{a}{2}+\frac{bx}{2}\right)\sin\left(\frac{a}{2}+\frac{bx}{2}\right)\right)\,dx$$

Optimal antiderivative

$$-\frac{\sin(bx+a)}{b}+\frac{\ln\left(\cos\left(\frac{a}{2}+\frac{bx}{2}\right)\sin\left(\frac{a}{2}+\frac{bx}{2}\right)\right)\sin(bx+a)}{b}$$

command

`integrate(cos(b*x+a)*log(cos(1/2*a+1/2*b*x)*sin(1/2*a+1/2*b*x)),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\log\left(\cos\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)\sin\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)\right)\sin\left(bx+a\right)}{b}-\frac{\sin\left(bx+a\right)}{b}$$

18 Test file number 65

Test folder name:

`test_cases/4_Trig_functions/4.1_Sine/65_4.1.0-a_sin-^m-b_trg-^n`

18.1 Problem number 190

$$\int \frac{\sin(a+bx)}{(d\cos(a+bx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{bd\sqrt{d\cos(bx+a)}}$$

command

`integrate(sin(b*x+a)/(d*cos(b*x+a))^(3/2),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2}{\sqrt{d\cos\left(bx+a\right)}\,bd}$$

18.2 Problem number 191

$$\int \frac{\sin(a+bx)}{(d\cos(a+bx))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{3bd\left(d\cos(bx+a)\right)^{\frac{3}{2}}}$$

command

```
integrate(sin(b*x+a)/(d*cos(b*x+a))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2}{3\sqrt{d\cos\left(bx+a\right)}\,bd^2\cos\left(bx+a\right)}$$

18.3 Problem number 192

$$\int \frac{\sin(a+bx)}{(d\cos(a+bx))^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{5bd\left(d\cos(bx+a)\right)^{\frac{5}{2}}}$$

command

```
integrate(sin(b*x+a)/(d*cos(b*x+a))^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2}{5\sqrt{d\cos\left(bx+a\right)}\,bd^3\cos\left(bx+a\right)^2}$$

18.4 Problem number 193

$$\int \frac{\sin(a+bx)}{(d\cos(a+bx))^{9/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{7bd\,(d\cos(bx+a))^{\frac{7}{2}}}$$

command

```
integrate(sin(b*x+a)/(d*cos(b*x+a))^(9/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2}{7\sqrt{d\cos(bx+a)}\,bd^4\cos(bx+a)^3}$$

18.5 Problem number 206

$$\int \frac{\sin^3(a+bx)}{(d\cos(a+bx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{2(d\cos(bx+a))^{\frac{3}{2}}}{3b\,d^3}+\frac{2}{bd\sqrt{d\cos(bx+a)}}$$

command

```
integrate(sin(b*x+a)^3/(d*cos(b*x+a))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{\sqrt{d\cos(bx+a)}\cos(bx+a)}{d}+\frac{3}{\sqrt{d\cos(bx+a)}}\right)}{3\,bd}$$

18.6 Problem number 207

$$\int \frac{\sin^3(a+bx)}{(d\cos(a+bx))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{3bd\,(d\cos(bx+a))^{\frac{3}{2}}}+\frac{2\sqrt{d\cos(bx+a)}}{b\,d^3}$$

command

```
integrate(sin(b*x+a)^3/(d*cos(b*x+a))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(3\sqrt{d\cos\left(bx+a\right)}\,b^2+\frac{b^2d}{\sqrt{d\cos\left(bx+a\right)}\cos(bx+a)}\right)}{3\,b^3d^3}$$

18.7 Problem number 208

$$\int \frac{\sin^3(a+bx)}{(d\cos(a+bx))^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{5bd\,(d\cos(bx+a))^{\frac{5}{2}}}-\frac{2}{b\,d^3\sqrt{d\cos(bx+a)}}$$

command

```
integrate(sin(b*x+a)^3/(d*cos(b*x+a))^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(5\,b^3d^3\cos\left(bx+a\right)^2-b^3d^3\right)}{5\sqrt{d\cos\left(bx+a\right)}\,b^4d^6\cos\left(bx+a\right)^2}$$

18.8 Problem number 209

$$\int \frac{\sin^3(a+bx)}{(d\cos(a+bx))^{9/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{7bd\,(d\cos(bx+a))^{\frac{7}{2}}}-\frac{2}{3b\,d^3\,(d\cos(bx+a))^{\frac{3}{2}}}$$

command

```
integrate(sin(b*x+a)^3/(d*cos(b*x+a))^(9/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(7\,b^4d^4\cos\left(bx+a\right)^2-3\,b^4d^4\right)}{21\,\sqrt{d\cos\left(bx+a\right)}\,b^5d^8\cos\left(bx+a\right)^3}$$

18.9 Problem number 210

$$\int \frac{\sin^3(a+bx)}{(d\cos(a+bx))^{11/2}}\,dx$$

Optimal antiderivative

$$\frac{2}{9bd\,(d\cos(bx+a))^{\frac{9}{2}}}-\frac{2}{5b\,d^3\,(d\cos(bx+a))^{\frac{5}{2}}}$$

command

```
integrate(sin(b*x+a)^3/(d*cos(b*x+a))^(11/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(9\,b^5d^5\cos\left(bx+a\right)^2-5\,b^5d^5\right)}{45\,\sqrt{d\cos\left(bx+a\right)}\,b^6d^{10}\cos\left(bx+a\right)^4}$$

18.10 Problem number 228

$$\int \frac{\csc(a+bx)}{(d\cos(a+bx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{\arctan\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{3}{2}}} - \frac{\operatorname{arctanh}\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{3}{2}}} + \frac{2}{bd\sqrt{d\cos(bx+a)}}$$

command

```
integrate(csc(b*x+a)/(d*cos(b*x+a))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\arctan\left(-\frac{\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2-\sqrt{-d\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^4+d}}{\sqrt{-d}}\right)}{\sqrt{-d}} + \frac{\log\left(\left|-\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2+\sqrt{-d\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^4+d}\right|\right)}{\sqrt{-d}}}{2\,bd}$$

18.11 Problem number 229

$$\int \frac{\csc(a+bx)}{(d\cos(a+bx))^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{\arctan\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{5}{2}}} - \frac{\operatorname{arctanh}\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{5}{2}}} + \frac{2}{3bd\,(d\cos(bx+a))^{\frac{3}{2}}}$$

command

```
integrate(csc(b*x+a)/(d*cos(b*x+a))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{6\arctan\left(-\frac{\sqrt{-d}\,\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^2-\sqrt{-d\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^4+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{3\log\left(\left|-\sqrt{-d}\,\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^2+\sqrt{-d\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right.}\right.\right.}{\sqrt{-d}}$$

$$6\,bd^2$$

18.12 Problem number 230

$$\int \frac{\csc(a+bx)}{(d\cos(a+bx))^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{\arctan\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{7}{2}}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{7}{2}}}+\frac{2}{5bd\left(d\cos(bx+a)\right)^{\frac{5}{2}}}+\frac{2}{b\,d^3\sqrt{d\cos(bx+a)}}$$

command

```
integrate(csc(b*x+a)/(d*cos(b*x+a))^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{10\arctan\left(-\frac{\sqrt{-d}\,\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^2-\sqrt{-d\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^4+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+\frac{5\log\left(\left|-\sqrt{-d}\,\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^2+\sqrt{-d\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right.}\right.\right.}{\sqrt{-d}}$$

18.13 Problem number 231

$$\int \frac{\csc(a+bx)}{(d\cos(a+bx))^{9/2}}\,dx$$

Optimal antiderivative

$$-\frac{\arctan\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{9}{2}}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{b\,d^{\frac{9}{2}}}+\frac{2}{7bd\,(d\cos(bx+a))^{\frac{7}{2}}}+\frac{2}{3b\,d^{3}\,(d\cos(bx+a))^{\frac{3}{2}}}$$

command

```
integrate(csc(b*x+a)/(d*cos(b*x+a))^(9/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{42\arctan\left(-\frac{\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^{2}-\sqrt{-d\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^{4}+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{21\log\left(\left|-\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^{2}+\sqrt{-d\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\right.\right.\right.}}{\sqrt{-d}}$$

18.14 Problem number 249

$$\int \frac{\csc^{3}(a+bx)}{(d\cos(a+bx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{5\arctan\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{4b\,d^{\frac{3}{2}}}-\frac{5\operatorname{arctanh}\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{4b\,d^{\frac{3}{2}}}+\frac{5}{2bd\sqrt{d\cos(bx+a)}}-\frac{\csc^{2}(bx+a)}{2bd\sqrt{d\cos(bx+a)}}$$

command

```
integrate(csc(b*x+a)^3/(d*cos(b*x+a))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{10 \arctan\left(-\frac{\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2-\sqrt{-d\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^4+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+\frac{5\log\left(\left|-\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2+\sqrt{-d\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^4+d}\right|\right)}{\sqrt{-d}}$$

18.15 Problem number 250

$$\int \frac{\csc^3(a+bx)}{(d\cos(a+bx))^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{7\arctan\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{4b\,d^{\frac{5}{2}}}-\frac{7\operatorname{arctanh}\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{4b\,d^{\frac{5}{2}}}+\frac{7}{6bd\,(d\cos(bx+a))^{\frac{3}{2}}}-\frac{\csc^2(bx+a)}{2bd\,(d\cos(bx+a))^{\frac{3}{2}}}$$

command

```
integrate(csc(b*x+a)^3/(d*cos(b*x+a))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{42 \arctan\left(-\frac{\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2-\sqrt{-d\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^4+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{21\log\left(\left|-\sqrt{-d}\,\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\right.\right.\right.}{\sqrt{-d}}$$

18.16 Problem number 251

$$\int \frac{\csc^3(a+bx)}{(d\cos(a+bx))^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{9\arctan\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{4b\,d^{\frac{7}{2}}} - \frac{9\operatorname{arctanh}\left(\frac{\sqrt{d\cos(bx+a)}}{\sqrt{d}}\right)}{4b\,d^{\frac{7}{2}}} + \frac{9}{10bd\,(d\cos(bx+a))^{\frac{5}{2}}} - \frac{\csc^2(bx+a)}{2bd\,(d\cos(bx+a))^{\frac{5}{2}}} + \frac{9}{2b\,d^3\sqrt{d\cos(bx+a)}}$$

command

```
integrate(csc(b*x+a)^3/(d*cos(b*x+a))^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{90\arctan\left(-\frac{\sqrt{-d}\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^2-\sqrt{-d\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^4+d}}{\sqrt{-d}}\right)}{\sqrt{-d}} + \frac{45\log\left(\left|-\sqrt{-d}\tan\left(\frac{1}{2}bx+\frac{1}{2}a\right)^2+\sqrt{-d\tan\left(\frac{1}{2}bx+\frac{1}{2}\right.\right.\right.}{\sqrt{-d}}$$

---

19 Test file number 70

Test folder name:

```
test_cases/4_Trig_functions/4.1_Sine/70_4.1.1.2-g_cos-^p-a+b_sin-^m
```

19.1 Problem number 164

$$\int \frac{\sec^2(c+dx)}{\sqrt{a+a\sin(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{3a\cos(dx+c)}{4d\left(a+a\sin(dx+c)\right)^{\frac{3}{2}}}-\frac{3\operatorname{arctanh}\left(\frac{\cos(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a+a\sin(dx+c)}}\right)\sqrt{2}}{8d\sqrt{a}}+\frac{\sec(dx+c)}{d\sqrt{a+a\sin(dx+c)}}$$

command

```
integrate(sec(d*x+c)^2/(a+a*sin(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{3\sqrt{2}\ \arctan\left(-\frac{\sqrt{2}\left(\sqrt{a}\ \tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\ +\sqrt{a}\right)}{2\sqrt{-a}}\right)}{\sqrt{-a}\ \operatorname{sgn}\left(\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)+1\right)}+\frac{4\left(\right.}{\left(\left(\sqrt{a}\ \tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}\right.\right.\right.}$$

19.2 Problem number 517

$$\int \frac{\cos^3(c+dx)}{(a+b\sin(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{2(a+b\sin(dx+c))^{\frac{3}{2}}}{3b^3d}+\frac{2a^2-2b^2}{b^3d\sqrt{a+b\sin(dx+c)}}+\frac{4a\sqrt{a+b\sin(dx+c)}}{b^3d}$$

command

```
integrate(cos(d*x+c)^3/(a+b*sin(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{3\left(a^2-b^2\right)}{\sqrt{b\sin\left(dx+c\right)+a}\,b^3}-\frac{\left(b\sin(dx+c)+a\right)^{\frac{3}{2}}b^6-6\sqrt{b\sin\left(dx+c\right)+a}\,ab^6}{b^9}\right)}{3\,d}$$

19.3 Problem number 518

$$\int \frac{\cos(c+dx)}{(a+b\sin(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{2}{bd\sqrt{a+b\sin(dx+c)}}$$

command

```
integrate(cos(d*x+c)/(a+b*sin(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2}{\sqrt{b\sin\left(dx+c\right)+a}\,bd}$$

19.4 Problem number 528

$$\int \frac{\cos^3(c+dx)}{(a+b\sin(c+dx))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{\frac{2a^2}{3}-\frac{2b^2}{3}}{b^3d\left(a+b\sin(dx+c)\right)^{\frac{3}{2}}}-\frac{4a}{b^3d\sqrt{a+b\sin(dx+c)}}-\frac{2\sqrt{a+b\sin(dx+c)}}{b^3d}$$

command

`integrate(cos(d*x+c)^3/(a+b*sin(d*x+c))^(5/2),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\frac{3\sqrt{b\sin(dx+c)+a}}{b^3}+\frac{6(b\sin(dx+c)+a)a-a^2+b^2}{(b\sin(dx+c)+a)^{\frac{3}{2}}b^3}\right)}{3d}$$

19.5 Problem number 529

$$\int \frac{\cos(c+dx)}{(a+b\sin(c+dx))^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2}{3bd\left(a+b\sin(dx+c)\right)^{\frac{3}{2}}}$$

command

`integrate(cos(d*x+c)/(a+b*sin(d*x+c))^(5/2),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2}{3\left(b\sin(dx+c)+a\right)^{\frac{3}{2}}bd}$$

20 Test file number 74

Test folder name:

`test_cases/4_Trig_functions/4.1_Sine/74_4.1.2.2-g_cos-^p-a+b_sin-^m-c+d_sin-^n`

20.1 Problem number 468

$$\int \frac{\cos(c+dx)\cot^3(c+dx)}{\sqrt{a+a\sin(c+dx)}}\,dx$$

Optimal antiderivative

$$\frac{9\operatorname{arctanh}\left(\frac{\cos(dx+c)\sqrt{a}}{\sqrt{a+a\sin(dx+c)}}\right)}{4d\sqrt{a}}-\frac{2\cos(dx+c)}{d\sqrt{a+a\sin(dx+c)}}$$
$$+\frac{\cot(dx+c)}{4d\sqrt{a+a\sin(dx+c)}}-\frac{\cot(dx+c)\csc(dx+c)}{2d\sqrt{a+a\sin(dx+c)}}$$

command

```
integrate(cos(d*x+c)^4*csc(d*x+c)^3/(a+a*sin(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(36\sqrt{2}\sqrt{a}\arctan\left(\frac{\sqrt{2}\sqrt{a}+\sqrt{a}}{\sqrt{-a}}\right)-18\sqrt{2}\sqrt{-a}\log\left(\sqrt{2}\sqrt{a}+\sqrt{a}\right)+54\sqrt{a}\arctan\left(\frac{\sqrt{2}\sqrt{a}+\sqrt{a}}{\sqrt{-a}}\right)-27\sqrt{-a}\log\left(\sqrt{2}\right.\right.}{2\sqrt{2}\sqrt{-a}\sqrt{a}+3\sqrt{-a}\sqrt{a}}$$

20.2 Problem number 469

$$\int \frac{\cot^4(c+dx)}{\sqrt{a+a\sin(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{7\operatorname{arctanh}\left(\frac{\cos(dx+c)\sqrt{a}}{\sqrt{a+a\sin(dx+c)}}\right)}{8d\sqrt{a}}+\frac{9\cot(dx+c)}{8d\sqrt{a+a\sin(dx+c)}}$$
$$+\frac{\cot(dx+c)\csc(dx+c)}{12d\sqrt{a+a\sin(dx+c)}}-\frac{\cot(dx+c)\left(\csc^2(dx+c)\right)}{3d\sqrt{a+a\sin(dx+c)}}$$

command

```
integrate(cos(d*x+c)^4*csc(d*x+c)^4/(a+a*sin(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\sqrt{a \tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}\left(\left(\frac{2\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)}{a\operatorname{sgn}\left(\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+1\right)}-\frac{3}{a\operatorname{sgn}\left(\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+1\right)}\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)-\frac{22}{a\operatorname{sgn}\left(\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+1\right)}\right)$$

20.3 Problem number 470

$$\int \frac{\cot^4(c+dx)\csc(c+dx)}{\sqrt{a+a\sin(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{11\operatorname{arctanh}\left(\frac{\cos(dx+c)\sqrt{a}}{\sqrt{a+a\sin(dx+c)}}\right)}{64d\sqrt{a}}-\frac{11\cot(dx+c)}{64d\sqrt{a+a\sin(dx+c)}}$$
$$+\frac{53\cot(dx+c)\csc(dx+c)}{96d\sqrt{a+a\sin(dx+c)}}+\frac{\cot(dx+c)\left(\csc^2(dx+c)\right)}{24d\sqrt{a+a\sin(dx+c)}}-\frac{\cot(dx+c)\left(\csc^3(dx+c)\right)}{4d\sqrt{a+a\sin(dx+c)}}$$

command

```
integrate(cos(d*x+c)^4*csc(d*x+c)^5/(a+a*sin(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

20.4 Problem number 471

$$\int \frac{\cot^4(c+dx)\csc^2(c+dx)}{\sqrt{a+a\sin(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{9\operatorname{arctanh}\left(\frac{\cos(dx+c)\sqrt{a}}{\sqrt{a+a\sin(dx+c)}}\right)}{128d\sqrt{a}}-\frac{9\cot(dx+c)}{128d\sqrt{a+a\sin(dx+c)}}-\frac{3\cot(dx+c)\csc(dx+c)}{64d\sqrt{a+a\sin(dx+c)}}$$
$$+\frac{29\cot(dx+c)\left(\csc^2(dx+c)\right)}{80d\sqrt{a+a\sin(dx+c)}}+\frac{\cot(dx+c)\left(\csc^3(dx+c)\right)}{40d\sqrt{a+a\sin(dx+c)}}-\frac{\cot(dx+c)\left(\csc^4(dx+c)\right)}{5d\sqrt{a+a\sin(dx+c)}}$$

command

```
integrate(cos(d*x+c)^4*csc(d*x+c)^6/(a+a*sin(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

21 Test file number 79

Test folder name:

```
test_cases/4_Trig_functions/4.1_Sine/79_4.1.7-d_trig-^m-a+b-c_sin-^n-^p
```

21.1 Problem number 499

$$\int (a+b\sin^2(e+fx))^{3/2}\tan^5(e+fx)\,dx$$

Optimal antiderivative

$$-\frac{\left(8a^2+40ab+35b^2\right)\left(a+b\left(\sin^2\left(fx+e\right)\right)\right)^{\frac{3}{2}}}{24\left(a+b\right)^2 f}$$
$$-\frac{\left(8a+9b\right)\left(\sec^2\left(fx+e\right)\right)\left(a+b\left(\sin^2\left(fx+e\right)\right)\right)^{\frac{5}{2}}}{8\left(a+b\right)^2 f}$$
$$+\frac{\left(\sec^4\left(fx+e\right)\right)\left(a+b\left(\sin^2\left(fx+e\right)\right)\right)^{\frac{5}{2}}}{4\left(a+b\right) f}$$
$$+\frac{\left(8a^2+40ab+35b^2\right)\operatorname{arctanh}\left(\frac{\sqrt{a+b\left(\sin^2\left(fx+e\right)\right)}}{\sqrt{a+b}}\right)}{8f\sqrt{a+b}}$$
$$-\frac{\left(8a^2+40ab+35b^2\right)\sqrt{a+b\left(\sin^2\left(fx+e\right)\right)}}{8\left(a+b\right) f}$$

command

```
integrate((a+b*sin(f*x+e)^2)^(3/2)*tan(f*x+e)^5,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

21.2 Problem number 558

$$\int \frac{\cot(c+dx)}{\sqrt{a+b\sin^4(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{a+b\left(\sin^4\left(dx+c\right)\right)}}{\sqrt{a}}\right)}{2d\sqrt{a}}$$

command

```
integrate(cot(d*x+c)/(a+b*sin(d*x+c)^4)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\arctan\left(\frac{\sqrt{b\sin\left(dx+c\right)^4+a}}{\sqrt{-a}}\right)}{2\sqrt{-a}\,d}$$

22 Test file number 89

Test folder name:

`test_cases/4_Trig_functions/4.2_Cosine/89_4.2.2.1-a+b_cos-^m-c+d_cos-^n`

22.1 Problem number 128

$$\int \frac{\sec^2(c+dx)}{\sqrt{a+a\cos(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos\left(dx+c\right)}}\right)}{d\sqrt{a}}+\frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a+a\cos\left(dx+c\right)}}\right)\sqrt{2}}{d\sqrt{a}}+\frac{\tan(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate(sec(d*x+c)^2/(a+a*cos(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\sqrt{2}\left(\frac{\sqrt{2}\sqrt{a}\log\left(\frac{\left|2\left(\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right)^2-4\sqrt{2}|a|-6a\right|}{\left|2\left(\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right)^2+4\sqrt{2}|a|-6a\right|}\right)}{|a|}+\frac{2\log\left(\left(\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{\right.\right.}\right.}{}\right.$$

$$-$$

22.2 Problem number 129

$$\int \frac{\sec^3(c+dx)}{\sqrt{a+a\cos(c+dx)}}\,dx$$

Optimal antiderivative

$$\frac{7\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{4d\sqrt{a}} - \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} - \frac{\tan(dx+c)}{4d\sqrt{a+a\cos(dx+c)}} + \frac{\sec(dx+c)\tan(dx+c)}{2d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate(sec(d*x+c)^3/(a+a*cos(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\sqrt{2}\left(\frac{7\sqrt{2}\,\sqrt{a}\,\log\left(\frac{\left|2\left(\sqrt{a}\,\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right)^2-4\sqrt{2}\,|a|-6a\right|}{\left|2\left(\sqrt{a}\,\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right)^2+4\sqrt{2}\,|a|-6a\right|}\right)}{|a|} + \frac{8\log\left(\left(\sqrt{a}\,\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right)^2-4\sqrt{2}\,|a|-6a\right)}{\sqrt{a}}\right.$$

22.3 Problem number 130

$$\int \frac{\sec^4(c+dx)}{\sqrt{a+a\cos(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{9\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{8d\sqrt{a}} + \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{7\tan(dx+c)}{8d\sqrt{a+a\cos(dx+c)}} - \frac{\sec(dx+c)\tan(dx+c)}{12d\sqrt{a+a\cos(dx+c)}} + \frac{\left(\sec^2(dx+c)\right)\tan(dx+c)}{3d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate(sec(d*x+c)^4/(a+a*cos(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\sqrt{2}\left(\frac{27\sqrt{2}\sqrt{a}\log\left(\frac{\left|2\left(\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^{2}+a}\right)^{2}-4\sqrt{2}|a|-6a\right|}{\left|2\left(\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^{2}+a}\right)^{2}+4\sqrt{2}|a|-6a\right|}\right)}{|a|}+\frac{48\log\left(\left(\left(\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\cdots\right.\right.\right.}{\cdots}\right.}{\cdots}$$

22.4 Problem number 144

$$\int \frac{\sec(c+dx)}{(a+a\cos(c+dx))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{2\,\mathrm{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos\left(dx+c\right)}}\right)}{a^{\frac{5}{2}}d}-\frac{\sin(dx+c)}{4d\left(a+a\cos(dx+c)\right)^{\frac{5}{2}}}-\frac{11\sin(dx+c)}{16ad\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}-\frac{43\,\mathrm{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos\left(dx+c\right)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d}$$

command

```
integrate(sec(d*x+c)/(a+a*cos(d*x+c))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\left(\frac{2\sqrt{2}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2}{a^3}+\frac{13\sqrt{2}}{a^3}\right)\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\frac{43\sqrt{2}\log\left(\left(\left(\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)-\sqrt{}\right.\right.\right.}{a^{\frac{5}{2}}}$$

23 Test file number 92

Test folder name:

`test_cases/4_Trig_functions/4.2_Cosine/92_4.2.3.1-a+b_cos-^m-c+d_cos-^n-A+B_cos-`

23.1 Problem number 107

$$\int \frac{\cos^4(c+dx)(A+B\cos(c+dx))}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{(A-B)\left(\cos^4(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}-\frac{(15A-19B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$+\frac{(651A-799B)\sin(dx+c)}{105ad\sqrt{a+a\cos(dx+c)}}+\frac{(63A-67B)\left(\cos^2(dx+c)\right)\sin(dx+c)}{70ad\sqrt{a+a\cos(dx+c)}}$$
$$-\frac{(7A-11B)\left(\cos^3(dx+c)\right)\sin(dx+c)}{14ad\sqrt{a+a\cos(dx+c)}}-\frac{(273A-397B)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{210a^2d}$$

command

```
integrate(cos(d*x+c)^4*(A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{105\left(15\sqrt{2}A-19\sqrt{2}B\right)\log\left(\left|-\sqrt{a}\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)+\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\frac{\left(\left(\left(\left(\frac{105\left(\sqrt{2}Aa^5-\sqrt{2}Ba^5\right)\tan\left(\frac{1}{2}dx+\right.\right.\right.\right.\right.}{a^3}$$

23.2 Problem number 108

$$\int \frac{\cos^3(c+dx)(A+B\cos(c+dx))}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{(A-B)\left(\cos^3(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}+\frac{(11A-15B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$-\frac{(65A-93B)\sin(dx+c)}{15ad\sqrt{a+a\cos(dx+c)}}-\frac{(5A-9B)\left(\cos^2(dx+c)\right)\sin(dx+c)}{10ad\sqrt{a+a\cos(dx+c)}}$$
$$+\frac{(35A-39B)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{30a^2d}$$

command

```
integrate(cos(d*x+c)^3*(A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{15\sqrt{2}\,(11A-15B)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)+\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\frac{\left(\left(\left(\frac{15\sqrt{2}\left(Aa^3-Ba^3\right)\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2}{a^2}+\frac{\sqrt{2}\,(}{}\right.\right.\right.\right.}{}$$
$$-\frac{}{60\,d}$$

23.3 Problem number 109

$$\int \frac{\cos^2(c+dx)(A+B\cos(c+dx))}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{(A-B)\left(\cos^2(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}-\frac{(7A-11B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$+\frac{(9A-13B)\sin(dx+c)}{3ad\sqrt{a+a\cos(dx+c)}}-\frac{(3A-7B)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{6a^2d}$$

command

```
integrate(cos(d*x+c)^2*(A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{3\left(7\sqrt{2}\,A-11\sqrt{2}\,B\right)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\frac{\left(\left(\frac{3\left(\sqrt{2}\,Aa-\sqrt{2}\,Ba\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2}{a}+\frac{2\left(1\right.\right.\right.}{}$$

$$12\,d$$

23.4 Problem number 110

$$\int \frac{\cos(c+dx)(A+B\cos(c+dx))}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(A-B)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}+\frac{(3A-7B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos\left(dx+c\right)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}+\frac{2B\sin(dx+c)}{ad\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate(cos(d*x+c)*(A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\frac{\sqrt{2}\left(Aa^2-Ba^2\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2}{a^3}+\frac{\sqrt{2}\left(Aa^2-9\,Ba^2\right)}{a^3}\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)}{\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}}+\frac{\sqrt{2}\,(3\,A-7\,B)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+\sqrt{a\tan\left(\frac{1}{2}\,dx+\right.\right.\right.}{a^{\frac{3}{2}}}$$

$$-\frac{}{4\,d}$$

23.5 Problem number 113

$$\int \frac{(A + B\cos(c + dx))\sec^2(c + dx)}{(a + a\cos(c + dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(3A - 2B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a\cos(dx + c)}}\right)}{a^{\frac{3}{2}}d} + \frac{(9A - 5B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a + a\cos(dx + c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} - \frac{(A - B)\tan(dx + c)}{2d\,(a + a\cos(dx + c))^{\frac{3}{2}}} + \frac{(3A - B)\tan(dx + c)}{2ad\sqrt{a + a\cos(dx + c)}}$$

command

```
integrate((A+B*cos(d*x+c))*sec(d*x+c)^2/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2}\left(9\,A\sqrt{a} - 5\,B\sqrt{a}\right)\log\left(\left(\sqrt{a}\tan\left(\frac{1}{2}dx + \frac{1}{2}c\right) - \sqrt{a\tan\left(\frac{1}{2}dx + \frac{1}{2}c\right)^2 + a}\right)^2\right)}{a^2} + \frac{4\left(3\,A\sqrt{a} - 2\,B\sqrt{a}\right)\log\left(\left|\left(\sqrt{a}\tan($$

$$-$$

24 Test file number 94

Test folder name:

```
test_cases/4_Trig_functions/4.2_Cosine/94_4.2.4.2-a+b_cos-^m-c+d_cos-^n-A+B_cos+C_cos^2-
```

24.1 Problem number 107

$$\int \frac{\left(A + C\cos^2(c+dx)\right)\sec^2(c+dx)}{\sqrt{a+a\cos(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{A\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{d\sqrt{a}} + \frac{(A+C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{A\tan(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+C*cos(d*x+c)^2)*sec(d*x+c)^2/(a+a*cos(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2}\,(A+C)\log\left(\left(\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)-\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}\right)^2\right)}{\sqrt{a}} + \frac{A\log\left(\left|\left(\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)-\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\right.\right.\right.\right.}{\sqrt{a}}$$

$$-$$

24.2 Problem number 109

$$\int \frac{\left(A + C\cos^2(c+dx)\right)\sec^4(c+dx)}{\sqrt{a+a\cos(c+dx)}}\,dx$$

Optimal antiderivative

$$-\frac{(9A+8C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{8d\sqrt{a}} + \frac{(A+C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{(7A+8C)\tan(dx+c)}{8d\sqrt{a+a\cos(dx+c)}} - \frac{A\sec(dx+c)\tan(dx+c)}{12d\sqrt{a+a\cos(dx+c)}} + \frac{A\left(\sec^2(dx+c)\right)\tan(dx+c)}{3d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+C*cos(d*x+c)^2)*sec(d*x+c)^4/(a+a*cos(d*x+c))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

24.3 Problem number 111

$$\int \frac{\cos^3(c+dx)\left(A+C\cos^2(c+dx)\right)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(A+C)\left(\cos^4(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}+\frac{(11A+19C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$-\frac{(455A+799C)\sin(dx+c)}{105ad\sqrt{a+a\cos(dx+c)}}-\frac{(35A+67C)\left(\cos^2(dx+c)\right)\sin(dx+c)}{70ad\sqrt{a+a\cos(dx+c)}}$$
$$+\frac{(7A+11C)\left(\cos^3(dx+c)\right)\sin(dx+c)}{14ad\sqrt{a+a\cos(dx+c)}}+\frac{(245A+397C)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{210a^2d}$$

command

```
integrate(cos(d*x+c)^3*(A+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{105\left(11\sqrt{2}\,A+19\sqrt{2}\,C\right)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)+\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\left(\left(\left(\left(\left(\frac{105\left(\sqrt{2}\,Aa^5+\sqrt{2}\,Ca^5\right)\tan\left(\frac{1}{2}d\right.\right.\right.\right.\right.\right.}{a^3}$$

$$-$$

24.4 Problem number 112

$$\int \frac{\cos^2(c+dx)\left(A+C\cos^2(c+dx)\right)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(A+C)\left(\cos^3(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}-\frac{(7A+15C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$+\frac{(15A+31C)\sin(dx+c)}{5ad\sqrt{a+a\cos(dx+c)}}+\frac{(5A+9C)\left(\cos^2(dx+c)\right)\sin(dx+c)}{10ad\sqrt{a+a\cos(dx+c)}}$$
$$-\frac{(5A+13C)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{10a^2d}$$

command

```
integrate(cos(d*x+c)^2*(A+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{5\sqrt{2}\,(7A+15C)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)+\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\frac{\left(\left(\left(\frac{5\sqrt{2}\left(Aa^3+Ca^3\right)\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2}{a^2}+\frac{\sqrt{2}\left(55Aa^3\right.}{a^2}\right.\right.\right.}{20\,d}$$

24.5 Problem number 113

$$\int \frac{\cos(c+dx)\left(A+C\cos^2(c+dx)\right)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(A+C)\left(\cos^2(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}+\frac{(3A+11C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$-\frac{(3A+13C)\sin(dx+c)}{3ad\sqrt{a+a\cos(dx+c)}}+\frac{(3A+7C)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{6a^2d}$$

command

```
integrate(cos(d*x+c)*(A+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{3\left(3\sqrt{2}\,A+11\sqrt{2}\,C\right)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\frac{\left(\left(\frac{3\left(\sqrt{2}\,Aa+\sqrt{2}\,Ca\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2}{a}+\frac{2}{-}\right.\right.}{12\,d}$$

24.6 Problem number 281

$$\int \frac{B\cos(c+dx)+C\cos^2(c+dx)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(B-C)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}+\frac{(3B-7C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}+\frac{2C\sin(dx+c)}{ad\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\frac{\sqrt{2}\left(Ba^2-Ca^2\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2}{a^3}+\frac{\sqrt{2}\left(Ba^2-9\,Ca^2\right)}{a^3}\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)}{\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}}+\frac{\sqrt{2}\,(3\,B-7\,C)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+\sqrt{a\tan\left(\frac{1}{2}\,dx+\right.\right.\right.}{a^{\frac{3}{2}}}$$

$$-\frac{}{4\,d}$$

24.7 Problem number 410

$$\int \frac{\cos^3(c+dx)\left(A+B\cos(c+dx)+C\cos^2(c+dx)\right)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{(A-B+C)\left(\cos^4(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}\\
&+\frac{(11A-15B+19C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}\\
&-\frac{(455A-651B+799C)\sin(dx+c)}{105ad\sqrt{a+a\cos(dx+c)}}-\frac{(35A-63B+67C)\left(\cos^2(dx+c)\right)\sin(dx+c)}{70ad\sqrt{a+a\cos(dx+c)}}\\
&+\frac{(7A-7B+11C)\left(\cos^3(dx+c)\right)\sin(dx+c)}{14ad\sqrt{a+a\cos(dx+c)}}\\
&+\frac{(245A-273B+397C)\sin(dx+c)\ \sqrt{a+a\cos(dx+c)}}{210a^2d}
\end{aligned}$$

command

```
integrate(cos(d*x+c)^3*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="g
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{105\left(11\sqrt{2}\,A-15\sqrt{2}\,B+19\sqrt{2}\,C\right)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\left(\left(\left(\left(\left(\frac{105\left(\sqrt{2}\,Aa^5-\sqrt{2}\,B\right.\right.\right.\right.\right.$$

$$-$$

24.8 Problem number 411

$$\int \frac{\cos^2(c+dx)\left(A+B\cos(c+dx)+C\cos^2(c+dx)\right)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(A-B+C)\left(\cos^3(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}$$
$$-\frac{(7A-11B+15C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$+\frac{(45A-65B+93C)\sin(dx+c)}{15ad\sqrt{a+a\cos(dx+c)}}+\frac{(5A-5B+9C)\left(\cos^2(dx+c)\right)\sin(dx+c)}{10ad\sqrt{a+a\cos(dx+c)}}$$
$$-\frac{(15A-35B+39C)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{30a^2d}$$

command

```
integrate(cos(d*x+c)^2*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="g
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{15\sqrt{2}\,(7A-11B+15C)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)+\sqrt{a\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\frac{\left(\left(\left(\frac{15\sqrt{2}\left(Aa^3-Ba^3+Ca^3\right)\tan\left(\frac{1}{2}dx+\frac{1}{2}c\right)^2}{a^2}-$$

24.9 Problem number 412

$$\int \frac{\cos(c+dx)\left(A+B\cos(c+dx)+C\cos^2(c+dx)\right)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(A-B+C)\left(\cos^2(dx+c)\right)\sin(dx+c)}{2d\left(a+a\cos(dx+c)\right)^{\frac{3}{2}}}$$
$$+\frac{(3A-7B+11C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$
$$-\frac{(3A-9B+13C)\sin(dx+c)}{3ad\sqrt{a+a\cos(dx+c)}}+\frac{(3A-3B+7C)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{6a^2d}$$

command

```
integrate(cos(d*x+c)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="gia
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{3\left(3\sqrt{2}\,A-7\sqrt{2}\,B+11\sqrt{2}\,C\right)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}\right|\right)}{a^{\frac{3}{2}}}+\frac{\left(\left(\frac{3\left(\sqrt{2}\,Aa-\sqrt{2}\,Ba+\sqrt{2}\,Ca\right)}{a}\right.\right.}{12\,d}$$

24.10 Problem number 413

$$\int \frac{A+B\cos(c+dx)+C\cos^2(c+dx)}{(a+a\cos(c+dx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{(A-B+C)\sin(dx+c)}{2d\,(a+a\cos(dx+c))^{\frac{3}{2}}}+\frac{(A+3B-7C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\,\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}+\frac{2C\sin(dx+c)}{ad\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\frac{\sqrt{2}\left(Aa^2-Ba^2+Ca^2\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2}{a^3}+\frac{\sqrt{2}\left(Aa^2-Ba^2+9\,Ca^2\right)}{a^3}\right)\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)}{\sqrt{a\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)^2+a}}-\frac{\sqrt{2}\,(A+3\,B-7\,C)\log\left(\left|-\sqrt{a}\,\tan\left(\frac{1}{2}\,dx+\frac{1}{2}\,c\right)+\sqrt{a\tan}\right.\right.}{4\,d}$$

25 Test file number 95

Test folder name:

`test_cases/4_Trig_functions/4.2_Cosine/95_4.2.7-d_trig-^m-a+b-c_cos-^n-^p`

25.1 Problem number 68

$$\int \frac{\cos(5+3x)}{\sqrt{3+\cos^2(5+3x)}}\,dx$$

Optimal antiderivative

$$\frac{\arcsin\left(\frac{\sin(5+3x)}{2}\right)}{3}$$

command

```
integrate(cos(5+3*x)/(3+cos(5+3*x)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{3}\arcsin\left(\frac{1}{2}\sin\left(3\,x+5\right)\right)$$

26 Test file number 98

Test folder name:

`test_cases/4_Trig_functions/4.3_Tangent/98_4.3.0-a_trg-^m-b_tan-^n`

26.1 Problem number 52

$$\int \left(b\tan^p(c+dx)\right)^{\frac{1}{p}}\,dx$$

Optimal antiderivative

$$-\frac{\cot(dx+c)\ln(\cos(dx+c))\left(b(\tan^p(dx+c))\right)^{\frac{1}{p}}}{d}$$

command

`integrate((b*tan(d*x+c)^p)^(1/p),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{4\,\pi|b|^{\left(\frac{1}{p}\right)}\left\lfloor\frac{dx+c}{\pi}+\frac{1}{2}\right\rfloor\tan\left(\frac{\pi\mathrm{sgn}(b)}{4p}-\frac{\pi}{4p}\right)+|b|^{\left(\frac{1}{p}\right)}\log\left(\frac{4}{\tan(dx+c)^2+1}\right)\tan\left(\frac{\pi\mathrm{sgn}(b)}{4p}-\frac{\pi}{4p}\right)^2-4\,c|b|^{\left(\frac{1}{p}\right)}\tan\left(\frac{\pi\mathrm{sgn}(b)}{4p}-\frac{\pi}{4}\right.}{2\left(d\tan\left(\frac{\pi\mathrm{sgn}(b)}{4p}-\frac{\pi}{4p}\right)^2+d\right)}$$

27 Test file number 103

Test folder name:

`test_cases/4_Trig_functions/4.3_Tangent/103_4.3.2.1-a+b_tan-^m-c+d_tan-^n`

27.1 Problem number 1137

$$\int(a+ia\tan(e+fx))^{5/2}\sqrt{c+d\tan(e+fx)}\,dx$$

Optimal antiderivative

$$\begin{aligned}&-\frac{(-1)^{\frac{1}{4}}\,a^{\frac{5}{2}}\left(c^2+10\,\mathrm{I}cd+23d^2\right)\mathrm{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}{\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}\right)}{4d^{\frac{3}{2}}f}\\&-\frac{4\,\mathrm{I}a^{\frac{5}{2}}\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}{\sqrt{c-\mathrm{I}d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}\right)\sqrt{2}\,\sqrt{c-\mathrm{I}d}}{f}\\&+\frac{a^2(c+9\,\mathrm{I}d)\,\sqrt{a+\mathrm{I}a\tan(fx+e)}\,\sqrt{c+d\tan(fx+e)}}{4df}\\&-\frac{a^2\sqrt{a+\mathrm{I}a\tan(fx+e)}\,(c+d\tan(fx+e))^{\frac{3}{2}}}{2df}\end{aligned}$$

command

`integrate((c+d*tan(f*x+e))^(1/2)*(a+I*a*tan(f*x+e))^(5/2),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(2\,(d\tan(fx+e)+c)^2a^2-2\,(d\tan(fx+e)+c)a^2c-2i\,(d\tan(fx+e)+c)a^2d\right)\sqrt{2\,ad^2+2\sqrt{(d\tan(fx+e)}}}{}$$

27.2 Problem number 1138

$$\int (a+ia\tan(e+fx))^{3/2}\sqrt{c+d\tan(e+fx)}\,dx$$

Optimal antiderivative

$$-\frac{2\,\mathrm{I}a^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}{\sqrt{c-\mathrm{I}d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}\right)\sqrt{2}\,\sqrt{c-\mathrm{I}d}}{f}$$
$$-\frac{(-1)^{\frac{1}{4}}\,a^{\frac{3}{2}}(\mathrm{I}c+3d)\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}{\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}\right)}{f\sqrt{d}}$$
$$+\frac{a^2(c+\mathrm{I}d)\sqrt{c+d\tan(fx+e)}}{df\sqrt{a+\mathrm{I}a\tan(fx+e)}}-\frac{a^2(c+d\tan(fx+e))^{\frac{3}{2}}}{df\sqrt{a+\mathrm{I}a\tan(fx+e)}}$$

command

```
integrate((c+d*tan(f*x+e))^(1/2)*(a+I*a*tan(f*x+e))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2\,ad^2+2\sqrt{(d\tan(fx+e)+c)^2-2\,(d\tan(fx+e)+c)c+c^2+d^2}\,ad}\,(d\tan(fx+e)+c)a\left(\frac{}{ad^2+\sqrt{(d\tan(fx}\right.}{2\,((-i\,d\tan(fx+e)-i\,c)d+}$$

27.3 Problem number 1143

$$\int (a+ia\tan(e+fx))^{5/2}(c+d\tan(e+fx))^{3/2}\,dx$$

Optimal antiderivative

$$-\frac{(-1)^{\frac{1}{4}}\, a^{\frac{5}{2}}(c-3\,\mathrm{I}d)\left(c^2+18\,\mathrm{I}cd+15d^2\right)\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\ \sqrt{a+\mathrm{I}a\tan\left(fx+e\right)}}{\sqrt{a}\ \sqrt{c+d\tan\left(fx+e\right)}}\right)}{8d^{\frac{3}{2}}f}$$
$$-\frac{4\,\mathrm{I}a^{\frac{5}{2}}(c-\mathrm{I}d)^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{a}\ \sqrt{c+d\tan\left(fx+e\right)}}{\sqrt{c-\mathrm{I}d}\ \sqrt{a+\mathrm{I}a\tan\left(fx+e\right)}}\right)\sqrt{2}}{f}$$
$$+\frac{a^2\left(c^2+14\,\mathrm{I}cd+19d^2\right)\sqrt{a+\mathrm{I}a\tan(fx+e)}\ \sqrt{c+d\tan(fx+e)}}{8df}$$
$$+\frac{a^2(c+13\,\mathrm{I}d)\sqrt{a+\mathrm{I}a\tan(fx+e)}\ (c+d\tan(fx+e))^{\frac{3}{2}}}{12df}$$
$$-\frac{a^2\sqrt{a+\mathrm{I}a\tan(fx+e)}\ (c+d\tan(fx+e))^{\frac{5}{2}}}{3df}$$

command

```
integrate((a+I*a*tan(f*x+e))^(5/2)*(c+d*tan(f*x+e))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(2\left(d\tan\left(fx+e\right)+c\right)^3a^2-2\left(d\tan\left(fx+e\right)+c\right)^2a^2c-2i\left(d\tan\left(fx+e\right)+c\right)^2a^2d\right)\sqrt{2\,ad^2+2\sqrt{(d\tan\left(fx+\right.}}{}$$

27.4 Problem number 1144

$$\int (a+ia\tan(e+fx))^{3/2}(c+d\tan(e+fx))^{3/2}\,dx$$

Optimal antiderivative

$$-\frac{2\,\mathrm{I}a^{\frac{3}{2}}(c-\mathrm{I}d)^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{a}\ \sqrt{c+d\tan\left(fx+e\right)}}{\sqrt{c-\mathrm{I}d}\ \sqrt{a+\mathrm{I}a\tan\left(fx+e\right)}}\right)\sqrt{2}}{f}$$
$$-\frac{(-1)^{\frac{1}{4}}\, a^{\frac{3}{2}}\left(3\,\mathrm{I}c^2+18cd-11\,\mathrm{I}d^2\right)\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\ \sqrt{a+\mathrm{I}a\tan\left(fx+e\right)}}{\sqrt{a}\ \sqrt{c+d\tan\left(fx+e\right)}}\right)}{4f\sqrt{d}}$$
$$+\frac{a(3\,\mathrm{I}c+5d)\sqrt{a+\mathrm{I}a\tan(fx+e)}\ \sqrt{c+d\tan(fx+e)}}{4f}$$
$$+\frac{a^2(c+\mathrm{I}d)\,(c+d\tan(fx+e))^{\frac{3}{2}}}{2df\sqrt{a+\mathrm{I}a\tan(fx+e)}}-\frac{a^2(c+d\tan(fx+e))^{\frac{5}{2}}}{2df\sqrt{a+\mathrm{I}a\tan(fx+e)}}$$

command

```
integrate((a+I*a*tan(f*x+e))^(3/2)*(c+d*tan(f*x+e))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2\,ad^2+2\,\sqrt{(d\tan(fx+e)+c)^2-2\,(d\tan(fx+e)+c)c+c^2+d^2}\,ad}\,(d\tan(fx+e)+c)^2a\left(\frac{}{ad^2+\sqrt{(d\tan(f}\right.}{2\left((-i\,d\tan(fx+e)-i\,c)d+\right.}$$

27.5 Problem number 1149

$$\int (a+ia\tan(e+fx))^{5/2}(c+d\tan(e+fx))^{5/2}\,dx$$

Optimal antiderivative

$$-\frac{(-1)^{\frac{1}{4}}\,a^{\frac{5}{2}}\left(5c^4+100\,\mathrm{I}c^3d+690c^2d^2-900\,\mathrm{I}c\,d^3-363d^4\right)\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}{\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}\right)}{64d^{\frac{3}{2}}f}$$

$$-\frac{4\,\mathrm{I}a^{\frac{5}{2}}(c-\mathrm{I}d)^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}{\sqrt{c-\mathrm{I}d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}\right)\sqrt{2}}{f}$$

$$+\frac{a^2\left(5c^3+95\,\mathrm{I}c^2d+273cd^2-149\,\mathrm{I}d^3\right)\sqrt{a+\mathrm{I}a\tan(fx+e)}\,\sqrt{c+d\tan(fx+e)}}{64df}$$

$$+\frac{a^2\left(5c^2+90\,\mathrm{I}cd+107d^2\right)\sqrt{a+\mathrm{I}a\tan(fx+e)}\,(c+d\tan(fx+e))^{\frac{3}{2}}}{96df}$$

$$+\frac{a^2(c+17\,\mathrm{I}d)\sqrt{a+\mathrm{I}a\tan(fx+e)}\,(c+d\tan(fx+e))^{\frac{5}{2}}}{24df}$$

$$-\frac{a^2\sqrt{a+\mathrm{I}a\tan(fx+e)}\,(c+d\tan(fx+e))^{\frac{7}{2}}}{4df}$$

command

```
integrate((a+I*a*tan(f*x+e))^(5/2)*(c+d*tan(f*x+e))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(2\,(d\tan(fx+e)+c)^4a^2-2\,(d\tan(fx+e)+c)^3a^2c-2i\,(d\tan(fx+e)+c)^3a^2d\right)\sqrt{2\,ad^2+2\,\sqrt{(d\tan(fx+}}{}$$

27.6 Problem number 1150

$$\int (a+ia\tan(e+fx))^{3/2}(c+d\tan(e+fx))^{5/2}\,dx$$

Optimal antiderivative

$$-\frac{2\,\mathrm{I}a^{\frac{3}{2}}(c-\mathrm{I}d)^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}{\sqrt{c-\mathrm{I}d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}\right)\sqrt{2}}{f}$$
$$-\frac{(-1)^{\frac{1}{4}}a^{\frac{3}{2}}\left(5\,\mathrm{I}c^3+45c^2d-55\,\mathrm{I}cd^2-23d^3\right)\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}{\sqrt{a}\,\sqrt{c+d\tan(fx+e)}}\right)}{8f\sqrt{d}}$$
$$+\frac{a(c-3\,\mathrm{I}d)(5\,\mathrm{I}c+3d)\sqrt{a+\mathrm{I}a\tan(fx+e)}\,\sqrt{c+d\tan(fx+e)}}{8f}$$
$$+\frac{a(5\,\mathrm{I}c+7d)\sqrt{a+\mathrm{I}a\tan(fx+e)}\,(c+d\tan(fx+e))^{\frac{3}{2}}}{12f}$$
$$+\frac{a^2(c+\mathrm{I}d)(c+d\tan(fx+e))^{\frac{5}{2}}}{3df\sqrt{a+\mathrm{I}a\tan(fx+e)}}-\frac{a^2(c+d\tan(fx+e))^{\frac{7}{2}}}{3df\sqrt{a+\mathrm{I}a\tan(fx+e)}}$$

command

```
integrate((a+I*a*tan(f*x+e))^(3/2)*(c+d*tan(f*x+e))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2\,ad^2+2\sqrt{(d\tan(fx+e)+c)^2-2(d\tan(fx+e)+c)c+c^2+d^2}\,ad}\,(d\tan(fx+e)+c)^3a\left(\frac{}{ad^2+\sqrt{(d\tan(f}\right.}{2((-i\,d\tan(fx+e)-i\,c)d+}$$

27.7 Problem number 1155

$$\int\frac{(a+ia\tan(e+fx))^{5/2}}{\sqrt{c+d\tan(e+fx)}}\,dx$$

Optimal antiderivative

$$-\frac{(-1)^{\frac{1}{4}}\, a^{\frac{5}{2}}(c+5\,\mathrm{I}d)\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\ \sqrt{a+\mathrm{I}a\tan(fx+e)}}{\sqrt{a}\ \sqrt{c+d\tan(fx+e)}}\right)}{d^{\frac{3}{2}}f}$$
$$-\frac{4\,\mathrm{I}a^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{a}\ \sqrt{c+d\tan(fx+e)}}{\sqrt{c-\mathrm{I}d}\ \sqrt{a+\mathrm{I}a\tan(fx+e)}}\right)\sqrt{2}}{f\sqrt{c-\mathrm{I}d}}$$
$$-\frac{a^2\sqrt{a+\mathrm{I}a\tan(fx+e)}\ \sqrt{c+d\tan(fx+e)}}{df}$$

command

```
integrate((a+I*a*tan(f*x+e))^(5/2)/(c+d*tan(f*x+e))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(2\left(d\tan(fx+e)+c\right)a^2-2\,a^2c-2i\,a^2d\right)\sqrt{2\,ad^2+2\sqrt{\left(d\tan(fx+e)+c\right)^2-2\left(d\tan(fx+e)+c\right)c+c^2+d^2}}}{4\left((d\tan(fx+e)\right.}$$

27.8 Problem number 1156

$$\int \frac{(a+ia\tan(e+fx))^{3/2}}{\sqrt{c+d\tan(e+fx)}}\,dx$$

Optimal antiderivative

$$-\frac{2\,\mathrm{I}a^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{a}\ \sqrt{c+d\tan(fx+e)}}{\sqrt{c-\mathrm{I}d}\ \sqrt{a+\mathrm{I}a\tan(fx+e)}}\right)\sqrt{2}}{f\sqrt{c-\mathrm{I}d}}$$
$$-\frac{2(-1)^{\frac{3}{4}}\, a^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\ \sqrt{a+\mathrm{I}a\tan(fx+e)}}{\sqrt{a}\ \sqrt{c+d\tan(fx+e)}}\right)}{f\sqrt{d}}$$

command

```
integrate((a+I*a*tan(f*x+e))^(3/2)/(c+d*tan(f*x+e))^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2\,ad^2+2\,\sqrt{(d\tan(fx+e)+c)^2-2\,(d\tan(fx+e)+c)c+c^2+d^2}\,ad}\;a\left(\frac{i\,(d\tan(f}{ad^2+\sqrt{(d\tan(fx+e)+c)^2a^2d^2-2}\right.}}{2\,((-i\,d\tan(fx+e)-i\,c)d+i\,cd+d^2)}$$

27.9 Problem number 1161

$$\int \frac{(a+ia\tan(e+fx))^{5/2}}{(c+d\tan(e+fx))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{2(-1)^{\frac{1}{4}}\,a^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{(-1)^{\frac{3}{4}}\sqrt{d}\;\sqrt{a+\mathrm{I}a\tan(fx+e)}}{\sqrt{a}\;\sqrt{c+d\tan(fx+e)}}\right)}{d^{\frac{3}{2}}f}$$
$$-\frac{4\,\mathrm{I}a^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\;\sqrt{a}\;\sqrt{c+d\tan(fx+e)}}{\sqrt{c-\mathrm{I}d}\;\sqrt{a+\mathrm{I}a\tan(fx+e)}}\right)\sqrt{2}}{(c-\mathrm{I}d)^{\frac{3}{2}}\,f}+\frac{2a^2(c+\mathrm{I}d)\,\sqrt{a+\mathrm{I}a\tan(fx+e)}}{(c-\mathrm{I}d)\,df\,\sqrt{c+d\tan(fx+e)}}$$

command

```
integrate((a+I*a*tan(f*x+e))^(5/2)/(c+d*tan(f*x+e))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\left(2\,(d\tan(fx+e)+c)a^2-2\,a^2c-2i\,a^2d\right)\sqrt{2\,ad^2+2\,\sqrt{(d\tan(fx+e)+c)^2-2\,(d\tan(fx+e)+c)c+c^2+d^2}}$$
$$-\frac{}{4\left((d\tan(fx+e)+c)^2d^2-(d\tan(fx+e)+c)^2\right.}$$

27.10 Problem number 1162

$$\int \frac{(a+ia\tan(e+fx))^{3/2}}{(c+d\tan(e+fx))^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{2\,\mathrm{I}a^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{c+d\tan\left(fx+e\right)}}{\sqrt{c-\mathrm{I}d}\,\sqrt{a+\mathrm{I}a\tan\left(fx+e\right)}}\right)\sqrt{2}}{(c-\mathrm{I}d)^{\frac{3}{2}}\,f}-\frac{2a\sqrt{a+\mathrm{I}a\tan(fx+e)}}{(\mathrm{I}c+d)\,f\sqrt{c+d\tan(fx+e)}}$$

command

```
integrate((a+I*a*tan(f*x+e))^(3/2)/(c+d*tan(f*x+e))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2\,ad^2+2\,\sqrt{\left(d\tan\left(fx+e\right)+c\right)^2-2\left(d\tan\left(fx+e\right)+c\right)c+c^2+d^2}\,ad}\;a\left(\frac{i\,(d\tan(f}{ad^2+\sqrt{(d\tan\left(fx+e\right)+c)^2a^2d^2-2}\right.}}{2\left(-i\left(d\tan\left(fx+e\right)+c\right)^2d+\left(i\,d\tan\left(fx+e\right)+i\,c\right)cd+(dt\right.}$$

27.11 Problem number 1167

$$\int \frac{(a+ia\tan(e+fx))^{5/2}}{(c+d\tan(e+fx))^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{4\,\mathrm{I}a^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{c+d\tan\left(fx+e\right)}}{\sqrt{c-\mathrm{I}d}\,\sqrt{a+\mathrm{I}a\tan\left(fx+e\right)}}\right)\sqrt{2}}{(c-\mathrm{I}d)^{\frac{5}{2}}\,f}$$
$$+\frac{4\,\mathrm{I}a^2\sqrt{a+\mathrm{I}a\tan(fx+e)}}{(c-\mathrm{I}d)^2\,f\sqrt{c+d\tan(fx+e)}}-\frac{2a(a+\mathrm{I}a\tan(fx+e))^{\frac{3}{2}}}{3\,(\mathrm{I}c+d)\,f\,(c+d\tan(fx+e))^{\frac{3}{2}}}$$

command

```
integrate((a+I*a*tan(f*x+e))^(5/2)/(c+d*tan(f*x+e))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(2\left(d\tan\left(fx+e\right)+c\right)a^2-2\,a^2c-2i\,a^2d\right)\sqrt{2\,ad^2+2\,\sqrt{\left(d\tan\left(fx+e\right)+c\right)^2-2\left(d\tan\left(fx+e\right)+c\right)c+c^2+d^2}}}{4\left(\left(d\tan\left(fx+e\right)+c\right)^3d^2-\left(d\tan\left(fx\right.\right.\right.}$$

27.12 Problem number 1168

$$\int \frac{(a+ia\tan(e+fx))^{3/2}}{(c+d\tan(e+fx))^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2\,\mathrm{I}a^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{c+d\tan\left(fx+e\right)}}{\sqrt{c-\mathrm{I}d}\,\sqrt{a+\mathrm{I}a\tan\left(fx+e\right)}}\right)\sqrt{2}}{(c-\mathrm{I}d)^{\frac{5}{2}}\,f}$$
$$+\frac{2\,\mathrm{I}a\sqrt{a+\mathrm{I}a\tan(fx+e)}}{(c-\mathrm{I}d)^2\,f\sqrt{c+d\tan(fx+e)}}-\frac{2d(a+\mathrm{I}a\tan(fx+e))^{\frac{3}{2}}}{3\left(c^2+d^2\right)f\left(c+d\tan(fx+e)\right)^{\frac{3}{2}}}$$

command

```
integrate((a+I*a*tan(f*x+e))^(3/2)/(c+d*tan(f*x+e))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2\,ad^2+2\,\sqrt{\left(d\tan\left(fx+e\right)+c\right)^2-2\left(d\tan\left(fx+e\right)+c\right)c+c^2+d^2}\,ad}\,a\left(\frac{i\left(d\tan\left(f\right.\right.\right.}{ad^2+\sqrt{\left(d\tan\left(fx+e\right)+c\right)^2a^2d^2-2}}\right.}{2\left(-i\left(d\tan\left(fx+e\right)+c\right)^3d+i\left(d\tan\left(fx+e\right)+c\right)^2cd+\left(d\tan\right.\right.}$$

28 Test file number 141

Test folder name:

`test_cases/4_Trig_functions/4.7_Miscellaneous/141_4.7.7_Trig_functions`

28.1 Problem number 421

$$\int \frac{1}{(5+4\cos(d+ex)+3\sin(d+ex))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{-3\cos(ex+d)+4\sin(ex+d)}{10e\left(5+4\cos(ex+d)+3\sin(ex+d)\right)^{\frac{3}{2}}}+\frac{\operatorname{arctanh}\left(\frac{\sin\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)\sqrt{2}}{2\sqrt{1+\cos\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)}}\right)\sqrt{10}}{100e}$$

command

```
integrate(1/(5+4*cos(e*x+d)+3*sin(e*x+d))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{100}\left(\frac{\sqrt{10}\,\log\left(\frac{\left|-2\sqrt{10}+2\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2+1}-2\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)-6\right|}{\left|2\sqrt{10}+2\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2+1}-2\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)-6\right|}\right)}{\operatorname{sgn}\left(\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)+3\right)}-\frac{20\left(19\left(\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2+1}\right.\right.}{\left(\left(\sqrt{\tan\left(\frac{1}{2}xe\right.\right.\right.}\right.$$

28.2 Problem number 422

$$\int \frac{1}{(5+4\cos(d+ex)+3\sin(d+ex))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{-3\cos(ex+d)+4\sin(ex+d)}{20e\left(5+4\cos(ex+d)+3\sin(ex+d)\right)^{\frac{5}{2}}}-\frac{3(3\cos(ex+d)-4\sin(ex+d))}{400e\left(5+4\cos(ex+d)+3\sin(ex+d)\right)^{\frac{3}{2}}}+\frac{3\operatorname{arctanh}\left(\frac{\sin\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)\sqrt{2}}{2\sqrt{1+\cos\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)}}\right)\sqrt{10}}{4000e}$$

command

```
integrate(1/(5+4*cos(e*x+d)+3*sin(e*x+d))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4000}\left(\frac{3\sqrt{10}\log\left(\frac{\left|-2\sqrt{10}+2\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2+1}-2\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)-6\right|}{\left|2\sqrt{10}+2\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2+1}-2\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)-6\right|}\right)}{\operatorname{sgn}\left(\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)+3\right)}-\frac{20\left(797\left(\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2}\right.\right.\right.$$

28.3 Problem number 428

$$\int \frac{1}{(-5+4\cos(d+ex)+3\sin(d+ex))^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{3\cos(ex+d)-4\sin(ex+d)}{10e\left(-5+4\cos(ex+d)+3\sin(ex+d)\right)^{\frac{3}{2}}}+\frac{\arctan\left(\frac{\sin\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)\sqrt{2}}{2\sqrt{-1+\cos\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)}}\right)\sqrt{10}}{100e}$$

command

```
integrate(1/(-5+4*cos(e*x+d)+3*sin(e*x+d))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{450}\left(\frac{9\sqrt{10}\,\arctan\left(\frac{1}{10}\sqrt{10}\left(-3i\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2+1}+3i\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)-i\right)\right)}{\operatorname{sgn}\left(-3\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)+1\right)}+\frac{10\left(33i\left(\sqrt{\tan}\right.\right.}{\left.\left.\right.\right.}\right.$$

28.4 Problem number 429

$$\int \frac{1}{(-5+4\cos(d+ex)+3\sin(d+ex))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{3\cos(ex+d)-4\sin(ex+d)}{20e\left(-5+4\cos(ex+d)+3\sin(ex+d)\right)^{\frac{5}{2}}}-\frac{3(3\cos(ex+d)-4\sin(ex+d))}{400e\left(-5+4\cos(ex+d)+3\sin(ex+d)\right)^{\frac{3}{2}}}$$
$$-\frac{3\arctan\left(\frac{\sin\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)\sqrt{2}}{2\sqrt{-1+\cos\left(d+ex-\arctan\left(\frac{3}{4}\right)\right)}}\right)\sqrt{10}}{4000e}$$

command

```
integrate(1/(-5+4*cos(e*x+d)+3*sin(e*x+d))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{162000}\left(\frac{243\sqrt{10}\arctan\left(\frac{1}{10}\sqrt{10}\left(3i\sqrt{\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)^2+1}-3i\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)+i\right)\right)}{\operatorname{sgn}\left(-3\tan\left(\frac{1}{2}xe+\frac{1}{2}d\right)+1\right)}+\frac{10\left(15039i\right.}{}\right.$$

28.5 Problem number 669

$$\int \frac{\cos(3x)}{\sqrt{4-\sin^2(3x)}}\,dx$$

Optimal antiderivative

$$\frac{\arcsin\left(\frac{\sin(3x)}{2}\right)}{3}$$

command

```
integrate(cos(3*x)/(4-sin(3*x)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{3}\arcsin\left(\frac{1}{2}\sin\left(3\,x\right)\right)$$

28.6 Problem number 734

$$\int \frac{\sec(3x)\tan(3x)}{\sqrt{1+5\cos^2(3x)}}\,dx$$

Optimal antiderivative

$$\frac{\sec(3x)\,\sqrt{1+5\left(\cos^2(3x)\right)}}{3}$$

command

```
integrate(sec(3*x)*tan(3*x)/(1+5*cos(3*x)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\sqrt{5}}{3\left(\left(\sqrt{5}\,\cos(3\,x)-\sqrt{5\,\cos(3\,x)^2+1}\right)^2-1\right)}$$

28.7 Problem number 740

$$\int \frac{\cot(5x)\csc^3(5x)}{\sqrt{1+\sin^2(5x)}}\,dx$$

Optimal antiderivative

$$\frac{2\csc(5x)\,\sqrt{1+\sin^2(5x)}}{15}-\frac{\left(\csc^3(5x)\right)\sqrt{1+\sin^2(5x)}}{15}$$

command

```
integrate(cot(5*x)*csc(5*x)^3/(1+sin(5*x)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{4\left(3\left(\sqrt{\sin(5\,x)^2+1}-\sin(5\,x)\right)^2-1\right)}{15\left(\left(\sqrt{\sin(5\,x)^2+1}-\sin(5\,x)\right)^2-1\right)^3}$$

29 Test file number 149

Test folder name:

`test_cases/5_Inverse_trig_functions/5.3_Inverse_tangent/149_5.3.3-d+e_x-^m-a+b_arctan-c_x^n-^p`

29.1 Problem number 24

$$\int \frac{a + b\text{ArcTan}\left(cx^2\right)}{(d+ex)^2}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{b\,c^2d^3\arctan\left(c\,x^2\right)}{e\left(c^2d^4+e^4\right)} + \frac{-a-b\arctan\left(c\,x^2\right)}{e\left(ex+d\right)} - \frac{2bcde\ln(ex+d)}{c^2d^4+e^4} \\
&+ \frac{bcde\ln\left(c^2x^4+1\right)}{2c^2d^4+2e^4} - \frac{b\left(c\,d^2-e^2\right)\arctan\left(-1+x\sqrt{2}\ \sqrt{c}\right)\sqrt{c}\ \sqrt{2}}{2\left(c^2d^4+e^4\right)} \\
&- \frac{b\left(c\,d^2-e^2\right)\arctan\left(1+x\sqrt{2}\ \sqrt{c}\right)\sqrt{c}\ \sqrt{2}}{2\left(c^2d^4+e^4\right)} \\
&- \frac{b\left(c\,d^2+e^2\right)\ln\left(1+c\,x^2-x\sqrt{2}\ \sqrt{c}\right)\sqrt{c}\ \sqrt{2}}{4\left(c^2d^4+e^4\right)} \\
&+ \frac{b\left(c\,d^2+e^2\right)\ln\left(1+c\,x^2+x\sqrt{2}\ \sqrt{c}\right)\sqrt{c}\ \sqrt{2}}{4c^2d^4+4e^4}
\end{aligned}$$

command

```
integrate((a+b*arctan(c*x^2))/(e*x+d)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

output too large to display

30 Test file number 153

Test folder name:

`test_cases/5_Inverse_trig_functions/5.3_Inverse_tangent/153_5.3.7_Inverse_tangent_functions`

30.1 Problem number 20

$$\int \sqrt{x}\,\mathrm{ArcTan}\left(\frac{\sqrt{-e}\,x}{\sqrt{d+ex^2}}\right)\,dx$$

Optimal antiderivative

$$\frac{2x^{\frac{3}{2}}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{e\,x^2+d}}\right)}{3}+\frac{4\sqrt{x}\,\sqrt{e\,x^2+d}}{9\sqrt{-e}}$$
$$+\frac{2d^{\frac{3}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)}{2}+\frac{1}{2}}\;\mathrm{EllipticF}\left(\sin\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right),\frac{\sqrt{2}}{2}\right)\sqrt{-e}\,\left(\sqrt{d}+x\sqrt{e}\right)\sqrt{\frac{e}{\left(\sqrt{d}\right.}}}{9\cos\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)e^{\frac{5}{4}}\sqrt{e\,x^2+d}}$$

command

```
integrate(x^(1/2)*arctan(x*(-e)^(1/2)/(e*x^2+d)^(1/2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$+\infty$$

30.2 Problem number 26

$$\int x^{3/2}\mathrm{ArcTan}\left(\frac{\sqrt{-e}\,x}{\sqrt{d+ex^2}}\right)\,dx$$

Optimal antiderivative

$$\frac{2x^{\frac{5}{2}}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{e\,x^2+d}}\right)}{5}+\frac{4x^{\frac{3}{2}}\sqrt{e\,x^2+d}}{25\sqrt{-e}}+\frac{12d\sqrt{-e}\ \sqrt{x}\ \sqrt{e\,x^2+d}}{25e^{\frac{3}{2}}\left(\sqrt{d}\ +x\sqrt{e}\right)}$$

$$-\frac{12d^{\frac{5}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)}{2}+\frac{1}{2}}\ \text{EllipticE}\left(\sin\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right),\frac{\sqrt{2}}{2}\right)\sqrt{-e}\ \left(\sqrt{d}\ +x\sqrt{e}\right)\sqrt{\frac{}{\left(\sqrt{}\right.}}}{25\cos\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)e^{\frac{7}{4}}\sqrt{e\,x^2+d}}$$

$$+\frac{6d^{\frac{5}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)}{2}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right),\frac{\sqrt{2}}{2}\right)\sqrt{-e}\ \left(\sqrt{d}\ +x\sqrt{e}\right)\sqrt{\frac{e}{\left(\sqrt{d}\right.}}}{25\cos\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)e^{\frac{7}{4}}\sqrt{e\,x^2+d}}$$

command

```
integrate(x^(3/2)*arctan(x*(-e)^(1/2)/(e*x^2+d)^(1/2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$+\infty$$

31 Test file number 164

Test folder name:

```
test_cases/6_Hyperbolic_functions/6.1_Hyperbolic_sine/164_6.1.7_hyper^m-a+b_sinh^n-
^p
```

31.1 Problem number 437

$$\int \frac{\tanh^5(e+fx)}{\sqrt{a+a\sinh^2(e+fx)}}\,dx$$

Optimal antiderivative

$$-\frac{a^2}{5f\left(a\left(\cosh^2\left(fx+e\right)\right)\right)^{\frac{5}{2}}}+\frac{2a}{3f\left(a\left(\cosh^2\left(fx+e\right)\right)\right)^{\frac{3}{2}}}-\frac{1}{f\sqrt{a\left(\cosh^2\left(fx+e\right)\right)}}$$

command

```
integrate(tanh(f*x+e)^5/(a+a*sinh(f*x+e)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(15\sqrt{a}\,e^{(9fx+9e)}+20\sqrt{a}\,e^{(7fx+7e)}+58\sqrt{a}\,e^{(5fx+5e)}+20\sqrt{a}\,e^{(3fx+3e)}+15\sqrt{a}\,e^{(fx+e)}\right)}{15af\left(e^{(2fx+2e)}+1\right)^5}$$

31.2 Problem number 438

$$\int \frac{\tanh^3(e+fx)}{\sqrt{a+a\sinh^2(e+fx)}}\,dx$$

Optimal antiderivative

$$\frac{a}{3f\left(a\left(\cosh^2(fx+e)\right)\right)^{\frac{3}{2}}}-\frac{1}{f\sqrt{a\left(\cosh^2(fx+e)\right)}}$$

command

```
integrate(tanh(f*x+e)^3/(a+a*sinh(f*x+e)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(3\sqrt{a}\,e^{(5fx+5e)}+2\sqrt{a}\,e^{(3fx+3e)}+3\sqrt{a}\,e^{(fx+e)}\right)}{3af\left(e^{(2fx+2e)}+1\right)^3}$$

31.3 Problem number 439

$$\int \frac{\tanh(e+fx)}{\sqrt{a+a\sinh^2(e+fx)}}\,dx$$

Optimal antiderivative

$$-\frac{1}{f\sqrt{a\left(\cosh^2(fx+e)\right)}}$$

command

```
integrate(tanh(f*x+e)/(a+a*sinh(f*x+e)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\,e^{(fx+e)}}{\sqrt{a}\,f\left(e^{(2\,fx+2\,e)}+1\right)}$$

31.4 Problem number 442

$$\int \frac{\tanh^4(e+fx)}{\sqrt{a+a\sinh^2(e+fx)}}\,dx$$

Optimal antiderivative

$$\frac{3\arctan(\sinh(fx+e))\cosh(fx+e)}{8f\sqrt{a\left(\cosh^2(fx+e)\right)}}-\frac{3\tanh(fx+e)}{8f\sqrt{a\left(\cosh^2(fx+e)\right)}}-\frac{\tanh^3(fx+e)}{4f\sqrt{a\left(\cosh^2(fx+e)\right)}}$$

command

```
integrate(tanh(f*x+e)^4/(a+a*sinh(f*x+e)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\frac{3\,\arctan\left(e^{(fx+e)}\right)}{\sqrt{a}}-\frac{5\sqrt{a}\,e^{(7\,fx+7\,e)}-3\sqrt{a}\,e^{(5\,fx+5\,e)}+3\sqrt{a}\,e^{(3\,fx+3\,e)}-5\sqrt{a}\,e^{(fx+e)}}{a\left(e^{(2\,fx+2\,e)}+1\right)^4}}{4\,f}$$

31.5 Problem number 443

$$\int \frac{\tanh^2(e+fx)}{\sqrt{a+a\sinh^2(e+fx)}}\,dx$$

Optimal antiderivative

$$\frac{\arctan(\sinh(fx+e))\cosh(fx+e)}{2f\sqrt{a\left(\cosh^2(fx+e)\right)}}-\frac{\tanh(fx+e)}{2f\sqrt{a\left(\cosh^2(fx+e)\right)}}$$

command

```
integrate(tanh(f*x+e)^2/(a+a*sinh(f*x+e)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\frac{\arctan\left(e^{(fx+e)}\right)}{\sqrt{a}}-\frac{\sqrt{a}\,e^{(3fx+3e)}-\sqrt{a}\,e^{(fx+e)}}{a\left(e^{(2fx+2e)}+1\right)^2}}{f}$$

31.6 Problem number 447

$$\int\frac{\tanh^5(e+fx)}{\left(a+a\sinh^2(e+fx)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{a^2}{7f\left(a\left(\cosh^2(fx+e)\right)\right)^{\frac{7}{2}}}+\frac{2a}{5f\left(a\left(\cosh^2(fx+e)\right)\right)^{\frac{5}{2}}}-\frac{1}{3f\left(a\left(\cosh^2(fx+e)\right)\right)^{\frac{3}{2}}}$$

command

```
integrate(tanh(f*x+e)^5/(a+a*sinh(f*x+e)^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{8\left(35\sqrt{a}\,e^{(11fx+11e)}-28\sqrt{a}\,e^{(9fx+9e)}+114\sqrt{a}\,e^{(7fx+7e)}-28\sqrt{a}\,e^{(5fx+5e)}+35\sqrt{a}\,e^{(3fx+3e)}\right)}{105\,a^2f\left(e^{(2fx+2e)}+1\right)^7}$$

31.7 Problem number 448

$$\int \frac{\tanh^3(e+fx)}{\left(a+a\sinh^2(e+fx)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{a}{5f\left(a\left(\cosh^2\left(fx+e\right)\right)\right)^{\frac{5}{2}}}-\frac{1}{3f\left(a\left(\cosh^2\left(fx+e\right)\right)\right)^{\frac{3}{2}}}$$

command

```
integrate(tanh(f*x+e)^3/(a+a*sinh(f*x+e)^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{8\left(5\sqrt{a}\,e^{(7fx+7e)}-2\sqrt{a}\,e^{(5fx+5e)}+5\sqrt{a}\,e^{(3fx+3e)}\right)}{15\,a^2f\left(e^{(2fx+2e)}+1\right)^5}$$

31.8 Problem number 449

$$\int \frac{\tanh(e+fx)}{\left(a+a\sinh^2(e+fx)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{1}{3f\left(a\left(\cosh^2\left(fx+e\right)\right)\right)^{\frac{3}{2}}}$$

command

```
integrate(tanh(f*x+e)/(a+a*sinh(f*x+e)^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{8\,e^{(3fx+3e)}}{3\,a^{\frac{3}{2}}f\left(e^{(2fx+2e)}+1\right)^3}$$

31.9 Problem number 452

$$\int \frac{\tanh^2(e+fx)}{\left(a+a\sinh^2(e+fx)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{\arctan(\sinh(fx+e))\cosh(fx+e)}{8af\sqrt{a\left(\cosh^2(fx+e)\right)}}+\frac{\tanh(fx+e)}{8af\sqrt{a\left(\cosh^2(fx+e)\right)}}-\frac{\operatorname{sech}(fx+e)^2\tanh(fx+e)}{4af\sqrt{a\left(\cosh^2(fx+e)\right)}}$$

command

```
integrate(tanh(f*x+e)^2/(a+a*sinh(f*x+e)^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\frac{\arctan\left(e^{(fx+e)}\right)}{a^{\frac{3}{2}}}+\frac{\sqrt{a}\,e^{(7fx+7e)}-7\sqrt{a}\,e^{(5fx+5e)}+7\sqrt{a}\,e^{(3fx+3e)}-\sqrt{a}\,e^{(fx+e)}}{a^2\left(e^{(2fx+2e)}+1\right)^4}}{4f}$$

31.10 Problem number 455

$$\int \frac{\coth^6(e+fx)}{\left(a+a\sinh^2(e+fx)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{\coth(fx+e)\operatorname{csch}(fx+e)^2}{3af\sqrt{a\left(\cosh^2(fx+e)\right)}}-\frac{\coth(fx+e)\operatorname{csch}(fx+e)^4}{5af\sqrt{a\left(\cosh^2(fx+e)\right)}}$$

command

```
integrate(coth(f*x+e)^6/(a+a*sinh(f*x+e)^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{8\left(5\sqrt{a}\,e^{(7fx+7e)}+2\sqrt{a}\,e^{(5fx+5e)}+5\sqrt{a}\,e^{(3fx+3e)}\right)}{15\,a^2f\left(e^{(2fx+2e)}-1\right)^5}$$

31.11 Problem number 456

$$\int \frac{\coth^8(e+fx)}{\left(a+a\sinh^2(e+fx)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{\coth(fx+e)\,\mathrm{csch}(fx+e)^2}{3af\sqrt{a\left(\cosh^2(fx+e)\right)}}-\frac{2\coth(fx+e)\,\mathrm{csch}(fx+e)^4}{5af\sqrt{a\left(\cosh^2(fx+e)\right)}}-\frac{\coth(fx+e)\,\mathrm{csch}(fx+e)^6}{7af\sqrt{a\left(\cosh^2(fx+e)\right)}}$$

command

```
integrate(coth(f*x+e)^8/(a+a*sinh(f*x+e)^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{8\left(35\sqrt{a}\,e^{(11fx+11e)}+28\sqrt{a}\,e^{(9fx+9e)}+114\sqrt{a}\,e^{(7fx+7e)}+28\sqrt{a}\,e^{(5fx+5e)}+35\sqrt{a}\,e^{(3fx+3e)}\right)}{105\,a^2f\left(e^{(2fx+2e)}-1\right)^7}$$

31.12 Problem number 486

$$\int \frac{\tanh^2(e+fx)}{\sqrt{a+b\sinh^2(e+fx)}}\,dx$$

Optimal antiderivative

$$-\frac{\sqrt{2}\,\sqrt{\frac{1}{1+\cosh(2fx+2e)}}\,\sqrt{1+\sinh^2(fx+e)}\,\mathrm{EllipticE}\left(\frac{\sinh(fx+e)}{\sqrt{1+\sinh^2(fx+e)}},\sqrt{1-\frac{b}{a}}\right)\mathrm{sech}(fx+e)\,\sqrt{a}}{(a-b)\,f\sqrt{\frac{\mathrm{sech}(fx+e)^2\left(a+b\left(\sinh^2(fx+e)\right)\right)}{a}}}$$

$$+\frac{\sqrt{2}\,\sqrt{\frac{1}{1+\cosh(2fx+2e)}}\,\sqrt{1+\sinh^2(fx+e)}\,\mathrm{EllipticF}\left(\frac{\sinh(fx+e)}{\sqrt{1+\sinh^2(fx+e)}},\sqrt{1-\frac{b}{a}}\right)\mathrm{sech}(fx+e)\,\sqrt{a}}{(a-b)\,f\sqrt{\frac{\mathrm{sech}(fx+e)^2\left(a+b\left(\sinh^2(fx+e)\right)\right)}{a}}}$$

command

```
integrate(tanh(f*x+e)^2/(a+b*sinh(f*x+e)^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$2\left(\frac{\arctan\left(-\frac{\sqrt{b}\,e^{(2fx+2e)}-\sqrt{be^{(4fx+4e)}+4ae^{(2fx+2e)}-2be^{(2fx+2e)}+b}+\sqrt{b}}{2\sqrt{a-b}}\right)e^{e}}{\sqrt{a-b}}-\frac{\arctan\left(-\frac{\sqrt{b}\,e^{(2fx+2e)}-\sqrt{be^{(4}\right.}\right.$$

31.13 Problem number 491

$$\int \frac{\tanh^3(e+fx)}{\left(a+b\sinh^2(e+fx)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{(2a+b)\operatorname{arctanh}\left(\frac{\sqrt{a+b\left(\sinh^2(fx+e)\right)}}{\sqrt{a-b}}\right)}{2(a-b)^{\frac{5}{2}}f}+\frac{2a+b}{2(a-b)^2 f\sqrt{a+b\left(\sinh^2(fx+e)\right)}}+\frac{\operatorname{sech}(fx+e)^2}{2(a-b)f\sqrt{a+b\left(\sinh^2(fx+e)\right)}}$$

command

```
integrate(tanh(f*x+e)^3/(a+b*sinh(f*x+e)^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: RuntimeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

32 Test file number 169

Test folder name:

`test_cases/6_Hyperbolic_functions/6.2_Hyperbolic_cosine/169_6.2.5_Hyperbolic_cosine_functions`

32.1 Problem number 47

$$\int \frac{1}{(a+a\cosh(c+dx))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{\sinh(dx+c)}{4d\left(a+a\cosh(dx+c)\right)^{\frac{5}{2}}}+\frac{3\sinh(dx+c)}{16ad\left(a+a\cosh(dx+c)\right)^{\frac{3}{2}}}+\frac{3\arctan\left(\frac{\sinh(dx+c)\sqrt{a}\ \sqrt{2}}{2\sqrt{a+a\cosh\left(dx+c\right)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d}$$

command

```
integrate(1/(a+a*cosh(d*x+c))^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{2}\left(\frac{3\arctan\left(e^{\left(\frac{1}{2}dx+\frac{1}{2}c\right)}\right)}{a^{\frac{5}{2}}}+\frac{3a^{\frac{7}{2}}e^{\left(\frac{7}{2}dx+\frac{7}{2}c\right)}+11a^{\frac{7}{2}}e^{\left(\frac{5}{2}dx+\frac{5}{2}c\right)}-11a^{\frac{7}{2}}e^{\left(\frac{3}{2}dx+\frac{3}{2}c\right)}-3a^{\frac{7}{2}}e^{\left(\frac{1}{2}dx+\frac{1}{2}c\right)}}{\left(ae^{(dx+c)}+a\right)^{4}a^{2}}\right)}{16\,d}$$

33 Test file number 173

Test folder name:

`test_cases/6_Hyperbolic_functions/6.3_Hyperbolic_tangent/173_6.3.7-d_hyper-^m-a+b-c_tanh-^n-^p`

33.1 Problem number 26

$$\int \frac{\sinh^3(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$-\frac{a\cosh(dx+c)}{(a+b)^2\,d}+\frac{\cosh^3(dx+c)}{3\,(a+b)\,d}+\frac{a\,\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{(a+b)^{\frac{5}{2}}\,d}$$

command

```
integrate(sinh(d*x+c)^3/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$24\sqrt{a^2-b^2+2\sqrt{-ab}\,(a+b)}\left(ab-\sqrt{-ab}\,a\right)\left|ae^{(2\,c)}+be^{(2\,c)}\right|\arctan\left(\frac{\sqrt{\frac{a^3e^{(2\,c)}+a^2be^{(2\,c)}-ab^2e^{(2\,c)}-b^3e^{(2\,c)}+\sqrt{(a}}}}{a^5+3\,a^4b+2\,a^3b^2-2\,a^2b^3-3\,ab^4-b^}\right.$$

$$-$$

33.2 Problem number 28

$$\int \frac{\sinh(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{\cosh(dx+c)}{(a+b)\,d}-\frac{\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{(a+b)^{\frac{3}{2}}\,d}$$

command

```
integrate(sinh(d*x+c)/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.3 Problem number 29

$$\int \frac{\operatorname{csch}(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}(\cosh(dx+c))}{ad}+\frac{\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{ad\sqrt{a+b}}$$

command

```
integrate(csch(d*x+c)/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.4 Problem number 31

$$\int \frac{\operatorname{csch}^3(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{(a+2b)\operatorname{arctanh}(\cosh(dx+c))}{2a^2d}-\frac{\coth(dx+c)\operatorname{csch}(dx+c)}{2ad}-\frac{\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}\ \sqrt{a+b}}{a^2d}$$

command

```
integrate(csch(d*x+c)^3/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(3ab-b^2-\sqrt{-ab}\,(a-3b)\right)\left|ae^{(2c)}+be^{(2c)}\right|\arctan\left(\frac{e^{(dx)}}{\sqrt{\frac{a^3e^{(2c)}-a^2be^{(2c)}+\sqrt{\left(a^3e^{(2c)}-a^2be^{(2c)}\right)^2-\left(a^3e^{(4c)}+a^2be^{(4c)}\right)(}}{a^3e^{(4c)}+a^2be^{(4c)}}}}\right)}{\left(a^3-a^2b+2\sqrt{-ab}\,a^2\right)\sqrt{a^2-b^2+2\sqrt{-ab}\,(a+b)}}$$

33.5 Problem number 34

$$\int \frac{\sinh^3(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{(a-b)\cosh(dx+c)}{(a+b)^3\,d}+\frac{\cosh^3(dx+c)}{3\,(a+b)^2\,d}+\frac{ab\,\mathrm{sech}(dx+c)}{2\,(a+b)^3\,d\left(a+b-b\mathrm{sech}(dx+c)^2\right)}$$
$$+\frac{(3a-2b)\,\mathrm{arctanh}\left(\frac{\mathrm{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{2\,(a+b)^{\frac{7}{2}}\,d}$$

command

```
integrate(sinh(d*x+c)^3/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.6 Problem number 36

$$\int \frac{\sinh(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{3\cosh(dx+c)}{2\,(a+b)^2\,d}-\frac{\cosh(dx+c)}{2\,(a+b)\,d\left(a+b-b\mathrm{sech}(dx+c)^2\right)}-\frac{3\,\mathrm{arctanh}\left(\frac{\mathrm{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{2\,(a+b)^{\frac{5}{2}}\,d}$$

command

```
integrate(sinh(d*x+c)/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.7 Problem number 37

$$\int \frac{\operatorname{csch}(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}(\cosh(dx+c))}{a^2 d}+\frac{b\operatorname{sech}(dx+c)}{2a\,(a+b)\,d\left(a+b-b\operatorname{sech}(dx+c)^2\right)}$$
$$+\frac{(3a+2b)\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{2a^2\,(a+b)^{\frac{3}{2}}\,d}$$

command

```
integrate(csch(d*x+c)/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.8 Problem number 39

$$\int \frac{\operatorname{csch}^3(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{(a+4b)\operatorname{arctanh}(\cosh(dx+c))}{2a^3 d}-\frac{\coth(dx+c)\operatorname{csch}(dx+c)}{2ad\left(a+b-b\operatorname{sech}(dx+c)^2\right)}$$
$$-\frac{b\operatorname{sech}(dx+c)}{a^2 d\left(a+b-b\operatorname{sech}(dx+c)^2\right)}-\frac{(3a+4b)\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{2a^3 d\sqrt{a+b}}$$

command

```
integrate(csch(d*x+c)^3/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.9 Problem number 42

$$\int \frac{\sinh^3(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{(a-2b)\cosh(dx+c)}{(a+b)^4\,d}+\frac{\cosh^3(dx+c)}{3\,(a+b)^3\,d}+\frac{ab\,\mathrm{sech}(dx+c)}{4\,(a+b)^3\,d\left(a+b-b\mathrm{sech}(dx+c)^2\right)^2}$$
$$+\frac{(7a-4b)\,b\,\mathrm{sech}(dx+c)}{8\,(a+b)^4\,d\left(a+b-b\mathrm{sech}(dx+c)^2\right)}+\frac{5(3a-4b)\arctanh\left(\frac{\mathrm{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{8\,(a+b)^{\frac{9}{2}}\,d}$$

command

```
integrate(sinh(d*x+c)^3/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.10 Problem number 44

$$\int \frac{\sinh(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{15\cosh(dx+c)}{8\,(a+b)^3\,d}-\frac{\cosh(dx+c)}{4\,(a+b)\,d\left(a+b-b\mathrm{sech}(dx+c)^2\right)^2}$$
$$-\frac{5\cosh(dx+c)}{8\,(a+b)^2\,d\left(a+b-b\mathrm{sech}(dx+c)^2\right)}-\frac{15\arctanh\left(\frac{\mathrm{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{8\,(a+b)^{\frac{7}{2}}\,d}$$

command

```
integrate(sinh(d*x+c)/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.11 Problem number 45

$$\int \frac{\operatorname{csch}(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}(\cosh(dx+c))}{a^3 d}+\frac{b\operatorname{sech}(dx+c)}{4a\,(a+b)\,d\left(a+b-b\operatorname{sech}(dx+c)^2\right)^2}$$
$$+\frac{b(7a+4b)\operatorname{sech}(dx+c)}{8a^2\,(a+b)^2\,d\left(a+b-b\operatorname{sech}(dx+c)^2\right)}+\frac{\left(15a^2+20ab+8b^2\right)\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{8a^3\,(a+b)^{\frac{5}{2}}\,d}$$

command

```
integrate(csch(d*x+c)/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.12 Problem number 47

$$\int \frac{\operatorname{csch}^3(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{(a+6b)\operatorname{arctanh}(\cosh(dx+c))}{2a^4 d}-\frac{\coth(dx+c)\operatorname{csch}(dx+c)}{2ad\left(a+b-b\operatorname{sech}(dx+c)^2\right)^2}$$
$$-\frac{3b\operatorname{sech}(dx+c)}{4a^2 d\left(a+b-b\operatorname{sech}(dx+c)^2\right)^2}-\frac{b(11a+12b)\operatorname{sech}(dx+c)}{8a^3\,(a+b)\,d\left(a+b-b\operatorname{sech}(dx+c)^2\right)}$$
$$-\frac{\left(15a^2+40ab+24b^2\right)\operatorname{arctanh}\left(\frac{\operatorname{sech}(dx+c)\sqrt{b}}{\sqrt{a+b}}\right)\sqrt{b}}{8a^4\,(a+b)^{\frac{3}{2}}\,d}$$

command

`integrate(csch(d*x+c)^3/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.13 Problem number 106

$$\int \frac{\cosh^3(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{(a+2b)\sinh(dx+c)}{(a+b)^2\,d}+\frac{\sinh^3(dx+c)}{3\,(a+b)\,d}+\frac{b^2\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{(a+b)^{\frac{5}{2}}\,d\sqrt{a}}$$

command

`integrate(cosh(d*x+c)^3/(a+b*tanh(d*x+c)^2),x, algorithm="giac")`

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{24\left(ab^2+\sqrt{-ab}\,b^2\right)\sqrt{a^2-b^2+2\sqrt{-ab}\,(a+b)}\,\left|ae^{(2\,c)}+be^{(2\,c)}\right|\arctan\left(\frac{\sqrt{\frac{a^3e^{(2\,c)}+a^2be^{(2\,c)}-ab^2e^{(2\,c)}-b^3e^{(2\,c)}+\sqrt{(a}}}{}\right.}{a^6+3\,a^5b+2\,a^4b^2-2\,a^3b^3-3\,a^2b^4-ab^5-}$$

33.14 Problem number 108

$$\int \frac{\cosh(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{\sinh(dx+c)}{(a+b)\,d}+\frac{b\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{(a+b)^{\frac{3}{2}}\,d\sqrt{a}}$$

command

```
integrate(cosh(d*x+c)/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.15 Problem number 109

$$\int \frac{\operatorname{sech}(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{d\sqrt{a}\,\sqrt{a+b}}$$

command

```
integrate(sech(d*x+c)/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\left(a^3-10\,a^2b+5\,ab^2+\left(5\,a^2-10\,ab+b^2\right)\sqrt{-ab}\right)\sqrt{a^2-b^2+2\,\sqrt{-ab}\,(a+b)}\,\left|ae^{(2\,c)}+be^{(2\,c)}\right|\arctan\left(\frac{\sqrt{\frac{ae^{(2\,c)}-be^{(2\,c)}+\sqrt{\left(ae^{(2\,c}\right.}}{}}}{a^6-13\,a^5b-14\,a^4b^2+14\,a^3b^3+13\,a^2b^4-ab^5+2\left(3\,a^5-4\,a^4b-14\,a^3b^2-4\,a^2b^3+3\,ab^4\right)\sqrt{-a}\right.$$

33.16 Problem number 111

$$\int \frac{\operatorname{sech}^3(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$-\frac{\arctan(\sinh(dx+c))}{bd}+\frac{\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)\sqrt{a+b}}{bd\sqrt{a}}$$

command

```
integrate(sech(d*x+c)^3/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(2\sqrt{a^2-b^2+2\sqrt{-ab}\,(a+b)}\,ab^2|ae^{(2c)}+be^{(2c)}|+\sqrt{a^2-b^2+2\sqrt{-ab}\,(a+b)}\,\sqrt{-ab}\,(a+b)|ae^{(2c)}+be^{(2c)}||b|-(ab^2-b^3)\sqrt{a\cdots}\right.}{(a^3b+3\cdots}$$

33.17 Problem number 113

$$\int \frac{\operatorname{sech}^5(c+dx)}{a+b\tanh^2(c+dx)}\,dx$$

Optimal antiderivative

$$-\frac{(2a+3b)\arctan(\sinh(dx+c))}{2b^2d}+\frac{(a+b)^{\frac{3}{2}}\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{b^2d\sqrt{a}}-\frac{\operatorname{sech}(dx+c)\tanh(dx+c)}{2bd}$$

command

```
integrate(sech(d*x+c)^5/(a+b*tanh(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\sqrt{a^2-b^2+2\sqrt{-ab}\,(a+b)}\left(a+\sqrt{-ab}\right)|ae^{(2\,c)}+be^{(2\,c)}|\arctan\left(\frac{e^{(dx)}}{\sqrt{\frac{ab^2e^{(2\,c)}-b^3e^{(2\,c)}+\sqrt{\left(ab^2e^{(2\,c)}-b^3e^{(2\,c)}\right)^2-\left(ab^2e^{(2\,c)}\right.}}{ab^2e^{(4\,c)}+b^3e^{(4\,c)}}}}\right.}{a^2b^2-ab^3+2\sqrt{-ab}\,ab^2}$$

33.18 Problem number 115

$$\int \frac{\cosh^3(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{b^2(6a+b)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}(a+b)^{\frac{7}{2}}d}+\frac{(a+3b)\sinh(dx+c)}{(a+b)^3d}$$
$$+\frac{\sinh^3(dx+c)}{3(a+b)^2d}+\frac{b^3\sinh(dx+c)}{2a(a+b)^3d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$

command

```
integrate(cosh(d*x+c)^3/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.19 Problem number 117

$$\int \frac{\cosh(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{b(4a+b)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}(a+b)^{\frac{5}{2}}d}+\frac{\sinh(dx+c)}{(a+b)^2 d}+\frac{b^2\sinh(dx+c)}{2a(a+b)^2 d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$

command

```
integrate(cosh(d*x+c)/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.20 Problem number 118

$$\int \frac{\operatorname{sech}(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{(2a+b)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}(a+b)^{\frac{3}{2}}d}+\frac{b\sinh(dx+c)}{2a(a+b)d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$

command

```
integrate(sech(d*x+c)/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.21 Problem number 120

$$\int \frac{\operatorname{sech}^3(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{\sinh(dx+c)}{2ad\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}+\frac{\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}d\sqrt{a+b}}$$

command

```
integrate(sech(d*x+c)^3/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.22 Problem number 122

$$\int \frac{\operatorname{sech}^5(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{\arctan(\sinh(dx+c))}{b^2d}+\frac{(a+b)\sinh(dx+c)}{2abd\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$
$$-\frac{(2a-b)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)\sqrt{a+b}}{2a^{\frac{3}{2}}b^2d}$$

command

```
integrate(sech(d*x+c)^5/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.23 Problem number 124

$$\int \frac{\operatorname{sech}^7(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{(4a+5b)\arctan(\sinh(dx+c))}{2b^3d} - \frac{(4a-b)(a+b)^{\frac{3}{2}}\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}b^3d} + \frac{(a+b)(2a+b)\sinh(dx+c)}{2ab^2d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)} - \frac{\operatorname{sech}(dx+c)\tanh(dx+c)}{2bd\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$

command

```
integrate(sech(d*x+c)^7/(a+b*tanh(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.24 Problem number 126

$$\int \frac{\cosh(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{3b\left(8a^2+4ab+b^2\right)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}(a+b)^{\frac{7}{2}}d} + \frac{\sinh(dx+c)}{(a+b)^3d} + \frac{b^3\sinh(dx+c)}{4a(a+b)^3d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)^2} + \frac{3b^2(4a+b)\sinh(dx+c)}{8a^2(a+b)^3d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$

command

```
integrate(cosh(d*x+c)/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.25 Problem number 127

$$\int \frac{\operatorname{sech}(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{\left(8a^2+8ab+3b^2\right)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}(a+b)^{\frac{5}{2}}d}+\frac{b\left(\cosh^2(dx+c)\right)\sinh(dx+c)}{4a(a+b)d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)^2}$$
$$+\frac{3b(2a+b)\sinh(dx+c)}{8a^2(a+b)^2d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$

command

```
integrate(sech(d*x+c)/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.26 Problem number 129

$$\int \frac{\operatorname{sech}^3(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{(4a+3b)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}(a+b)^{\frac{3}{2}}d}+\frac{b\sinh(dx+c)}{4a(a+b)d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)^2}$$
$$+\frac{(4a+3b)\sinh(dx+c)}{8a^2(a+b)d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}$$

command

```
integrate(sech(d*x+c)^3/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

33.27 Problem number 131

$$\int \frac{\operatorname{sech}^5(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{\sinh(dx+c)}{4ad\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)^2}+\frac{3\sinh(dx+c)}{8a^2d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}+\frac{3\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}d\sqrt{a+b}}$$

command

```
integrate(sech(d*x+c)^5/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$3\left(a^3-10\,a^2b+5\,ab^2+\left(5\,a^2-10\,ab+b^2\right)\sqrt{-ab}\right)\sqrt{a^2-b^2+2\sqrt{-ab}\,(a+b)}\,\left|ae^{(2\,c)}+be^{(2\,c)}\right|\arctan\left(\frac{}{\sqrt{\frac{a^3e^{(2\,c)}-a^2be^{(2\,c)}+\sqrt{(}}}}\right.$$

$$\overline{a^8-13\,a^7b-14\,a^6b^2+14\,a^5b^3+13\,a^4b^4-a^3b^5+2\,(3\,a^7-4\,a^6b-14\,a^5b^2-4\,a^4b^3+3\,a}$$

33.28 Problem number 133

$$\int \frac{\operatorname{sech}^7(c+dx)}{\left(a+b\tanh^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{\arctan(\sinh(dx+c))}{b^3d}+\frac{(a+b)\sinh(dx+c)}{4abd\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)^2}-\frac{(4a-3b)(a+b)\sinh(dx+c)}{8a^2b^2d\left(a+(a+b)\left(\sinh^2(dx+c)\right)\right)}+\frac{\left(8a^2-4ab+3b^2\right)\arctan\left(\frac{\sinh(dx+c)\sqrt{a+b}}{\sqrt{a}}\right)\sqrt{a+b}}{8a^{\frac{5}{2}}b^3d}$$

command

```
integrate(sech(d*x+c)^7/(a+b*tanh(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

output too large to display

34 Test file number 176

Test folder name:

```
test_cases/6_Hyperbolic_functions/6.4_Hyperbolic_cotangent/176_6.4.7-d_hyper-^m-a+b-c_coth-^n-^p
```

34.1 Problem number 27

$$\int \left(a + b \coth^2(x)\right)^{3/2} \tanh^2(x)\, dx$$

Optimal antiderivative

$$-b^{\frac{3}{2}} \operatorname{arctanh}\left(\frac{\coth(x)\sqrt{b}}{\sqrt{a + b\left(\coth^2(x)\right)}}\right) + (a+b)^{\frac{3}{2}} \operatorname{arctanh}\left(\frac{\coth(x)\sqrt{a+b}}{\sqrt{a + b\left(\coth^2(x)\right)}}\right) - a\sqrt{a + b\left(\coth^2(x)\right)}\ \tanh(x)$$

command

```
integrate((a+b*coth(x)^2)^(3/2)*tanh(x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\,b^2\arctan\left(-\frac{\sqrt{a+b}\,e^{(2\,x)}-\sqrt{ae^{(4\,x)}+be^{(4\,x)}-2\,ae^{(2\,x)}+2\,be^{(2\,x)}+a+b}-\sqrt{a+b}}{2\sqrt{-b}}\right)\operatorname{sgn}\left(e^{(2\,x)}-1\right)}{\sqrt{-b}}$$
$$-\frac{1}{2}\,(a+b)^{\frac{3}{2}}\log\left(\left|\sqrt{a+b}\,e^{(2\,x)}-\sqrt{ae^{(4\,x)}+be^{(4\,x)}-2\,ae^{(2\,x)}+2\,be^{(2\,x)}+a+b}+\sqrt{a+b}\right|\right)\operatorname{sgn}\left(e^{(2\,x)}-1\right)$$
$$+\frac{1}{2}\,(a+b)^{\frac{3}{2}}\log\left(\left|-\sqrt{a+b}\,e^{(2\,x)}+\sqrt{ae^{(4\,x)}+be^{(4\,x)}-2\,ae^{(2\,x)}+2\,be^{(2\,x)}+a+b}+\sqrt{a+b}\right|\right)\operatorname{sgn}\left(e^{(2\,x)}-1\right)$$
$$-\frac{\left(a^2+2\,ab+b^2\right)\log\left(\left|-\left(\sqrt{a+b}\,e^{(2\,x)}-\sqrt{ae^{(4\,x)}+be^{(4\,x)}-2\,ae^{(2\,x)}+2\,be^{(2\,x)}+a+b}\right)(a+b)+\sqrt{a+b}\,(a-\right.}{2\sqrt{a+b}}$$
$$-\frac{4\left(\left(\sqrt{a+b}\,e^{(2\,x)}-\sqrt{ae^{(4\,x)}+be^{(4\,x)}-2\,ae^{(2\,x)}+2\,be^{(2\,x)}+a+b}\right)a^2\operatorname{sgn}\left(e^{(2\,x)}-1\right)-\sqrt{a-\right.}}{\left(\sqrt{a+b}\,e^{(2\,x)}-\sqrt{ae^{(4\,x)}+be^{(4\,x)}-2\,ae^{(2\,x)}+2\,be^{(2\,x)}+a+b}\right)^2+2\left(\sqrt{a+b}\,e^{(2\,x)}-\sqrt{ae^{(4\,x)}+be^{(4\,x)}-2\,ae\right.}$$

35 Test file number 180

Test folder name:

`test_cases/6_Hyperbolic_functions/6.5_Hyperbolic_secant/180_6.5.7-d_hyper-^m-a+b-c_sech-^n-^p`

35.1 Problem number 144

$$\int \frac{\coth(c+dx)}{a+b\operatorname{sech}^2(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{b\ln\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}{2a\,(a+b)\,d}+\frac{\ln(\sinh(dx+c))}{(a+b)\,d}$$

command

```
integrate(coth(d*x+c)/(a+b*sech(d*x+c)^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{2\,dx}{a}-\frac{b\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^2+ab}-\frac{2\,e^{(2\,c)}\log\left(\left|e^{(2\,dx+2\,c)}-1\right|\right)}{ae^{(2\,c)}+be^{(2\,c)}}}{2\,d}$$

35.2 Problem number 148

$$\int \frac{\tanh^5(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{(a+b)^2}{2a^2bd\left(b+a\left(\cosh^2(dx+c)\right)\right)}+\frac{\ln(\cosh(dx+c))}{b^2d}+\frac{\left(\frac{1}{a^2}-\frac{1}{b^2}\right)\ln\left(b+a\left(\cosh^2(dx+c)\right)\right)}{2d}$$

command

```
integrate(tanh(d*x+c)^5/(a+b*sech(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{2\,dx}{a^2}-\frac{2\log\left(e^{(2\,dx+2\,c)}+1\right)}{b^2}+\frac{\left(a^2-b^2\right)\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^2b^2}-\frac{a^2e^{(4\,dx+4\,c)}-b^2e^{(4\,dx+4\,c)}+2\,a^2e^{(2\,dx+2\,c)}+8\,ab}{\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be\right.}}{2\,d}$$

35.3 Problem number 150

$$\int \frac{\tanh^3(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{a+b}{2a^2d\left(b+a\left(\cosh^2(dx+c)\right)\right)}+\frac{\ln\left(b+a\left(\cosh^2(dx+c)\right)\right)}{2a^2d}$$

command

```
integrate(tanh(d*x+c)^3/(a+b*sech(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{2\,dx}{a^2}+\frac{e^{(4\,dx+4\,c)}-2\,e^{(2\,dx+2\,c)}+1}{\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)a}-\frac{\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^2}}{2\,d}$$

35.4 Problem number 152

$$\int \frac{\tanh(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{b}{2a^2d\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}+\frac{\ln\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}{2a^2d}$$

command

```
integrate(tanh(d*x+c)/(a+b*sech(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{2\,dx}{a^2}+\frac{e^{(4\,dx+4\,c)}+2\,e^{(2\,dx+2\,c)}+1}{\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)a}-\frac{\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^2}}{2\,d}$$

35.5 Problem number 154

$$\int \frac{\coth(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{b^2}{2a^2\left(a+b\right)d\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}+\frac{b(2a+b)\ln\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}{2a^2\left(a+b\right)^2d}+\frac{\ln(\sinh(dx+c))}{\left(a+b\right)^2d}$$

command

```
integrate(coth(d*x+c)/(a+b*sech(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(2\,ab+b^2\right)\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^4+2\,a^3b+a^2b^2}+\frac{2\,e^{(2\,c)}\log\left(\left|-e^{(2\,dx+2\,c)}+1\right|\right)}{a^2e^{(2\,c)}+2\,abe^{(2\,c)}+b^2e^{(2\,c)}}-\frac{2\,dx}{a^2}-\frac{2\,abe^{(4\,dx+4\,c)}+b^2e^{(4\,dx+4\,c)}+4\,abe^{(2\,dx+2}}{\left(a^3+2\,a^2b+ab^2\right)\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,d}}$$

$$2\,d$$

35.6 Problem number 156

$$\int \frac{\coth^3(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{b^3}{2a^2(a+b)^2 d\left(b+a\left(\cosh^2(dx+c)\right)\right)} - \frac{\operatorname{csch}(dx+c)^2}{2(a+b)^2 d} + \frac{b^2(3a+b)\ln\left(b+a\left(\cosh^2(dx+c)\right)\right)}{2a^2(a+b)^3 d} + \frac{(a+3b)\ln(\sinh(dx+c))}{(a+b)^3 d}$$

command

```
integrate(coth(d*x+c)^3/(a+b*sech(d*x+c)^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(3ab^2+b^3\right)\log\left(ae^{(4dx+4c)}+2ae^{(2dx+2c)}+4be^{(2dx+2c)}+a\right)}{a^5+3a^4b+3a^3b^2+a^2b^3} + \frac{2\left(ae^{(2c)}+3be^{(2c)}\right)\log\left(\left|-e^{(2dx+2c)}+1\right|\right)}{a^3e^{(2c)}+3a^2be^{(2c)}+3ab^2e^{(2c)}+b^3e^{(2c)}} - \frac{2dx}{a^2} - \frac{3ab^2e^{(4dx+4c)}+b^3e^{(4dx+4}}{(a^4+3a^3b+3a^2b^2+ab^3)(} \Bigg/ 2d$$

35.7 Problem number 159

$$\int \frac{\tanh^5(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{(a+b)^2}{4a^3 d\left(b+a\left(\cosh^2(dx+c)\right)\right)^2} + \frac{a+b}{a^3 d\left(b+a\left(\cosh^2(dx+c)\right)\right)} + \frac{\ln\left(b+a\left(\cosh^2(dx+c)\right)\right)}{2a^3 d}$$

command

```
integrate(tanh(d*x+c)^5/(a+b*sech(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{4dx}{a^3} - \frac{2\log\left(ae^{(4dx+4c)}+2ae^{(2dx+2c)}+4be^{(2dx+2c)}+a\right)}{a^3} + \frac{3ae^{(8dx+8c)}-4ae^{(6dx+6c)}+8be^{(6dx+6c)}+2ae^{(4dx+4c)}-16be^{(4dx+4c)}-4ae^{(2}}{\left(ae^{(4dx+4c)}+2ae^{(2dx+2c)}+4be^{(2dx+2c)}+a\right)^2a^2}}{4d}$$

35.8 Problem number 161

$$\int \frac{\tanh^3(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{b(a+b)}{4a^3d\left(b+a\left(\cosh^2(dx+c)\right)\right)^2}+\frac{a+2b}{2a^3d\left(b+a\left(\cosh^2(dx+c)\right)\right)}+\frac{\ln\left(b+a\left(\cosh^2(dx+c)\right)\right)}{2a^3d}$$

command

```
integrate(tanh(d*x+c)^3/(a+b*sech(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{4\,dx}{a^3}-\frac{2\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^3}+\frac{3\,ae^{(8\,dx+8\,c)}+4\,ae^{(6\,dx+6\,c)}+8\,be^{(6\,dx+6\,c)}+2\,ae^{(4\,dx+4\,c)}+4\,ae^{(2\,dx+2\,c)}+8\,be^{(2\,c}}{\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)^2a^2}}{4\,d}$$

35.9 Problem number 163

$$\int \frac{\tanh(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{b^2}{4a^3d\left(b+a\left(\cosh^2(dx+c)\right)\right)^2}+\frac{b}{a^3d\left(b+a\left(\cosh^2(dx+c)\right)\right)}+\frac{\ln\left(b+a\left(\cosh^2(dx+c)\right)\right)}{2a^3d}$$

command

```
integrate(tanh(d*x+c)/(a+b*sech(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{4\,dx}{a^3}-\frac{2\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^3}+\frac{3\,ae^{(8\,dx+8\,c)}+12\,ae^{(6\,dx+6\,c)}+8\,be^{(6\,dx+6\,c)}+18\,ae^{(4\,dx+4\,c)}+16\,be^{(4\,dx+4\,c)}+12\,c}{\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)^2a^2}}{4\,d}$$

35.10 Problem number 165

$$\int \frac{\coth(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{b^3}{4a^3\left(a+b\right)d\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)^2}+\frac{b^2(3a+2b)}{2a^3\left(a+b\right)^2d\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}$$
$$+\frac{b\left(3a^2+3ab+b^2\right)\ln\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}{2a^3\left(a+b\right)^3d}+\frac{\ln(\sinh(dx+c))}{\left(a+b\right)^3d}$$

command

```
integrate(coth(d*x+c)/(a+b*sech(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(3\,a^2b+3\,ab^2+b^3\right)\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^6+3\,a^5b+3\,a^4b^2+a^3b^3}+\frac{4\,e^{(2\,c)}\log\left(\left|-e^{(2\,dx+2\,c)}+1\right|\right)}{a^3e^{(2\,c)}+3\,a^2be^{(2\,c)}+3\,ab^2e^{(2\,c)}+b^3e^{(2\,c)}}-\frac{4\,dx}{a^3}-\frac{9\,a^3be^{(8\,dx+8\,c)}+9\,a^2}{}$$

35.11 Problem number 167

$$\int \frac{\coth^3(c+dx)}{\left(a+b\operatorname{sech}^2(c+dx)\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{b^4}{4a^3\left(a+b\right)^2d\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)^2}+\frac{b^3(2a+b)}{a^3\left(a+b\right)^3d\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}$$
$$-\frac{\operatorname{csch}(dx+c)^2}{2\left(a+b\right)^3d}+\frac{b^2\left(6a^2+4ab+b^2\right)\ln\left(b+a\left(\cosh^2\left(dx+c\right)\right)\right)}{2a^3\left(a+b\right)^4d}+\frac{(a+4b)\ln(\sinh(dx+c))}{\left(a+b\right)^4d}$$

command

```
integrate(coth(d*x+c)^3/(a+b*sech(d*x+c)^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(6\,a^2b^2+4\,ab^3+b^4\right)\log\left(ae^{(4\,dx+4\,c)}+2\,ae^{(2\,dx+2\,c)}+4\,be^{(2\,dx+2\,c)}+a\right)}{a^7+4\,a^6b+6\,a^5b^2+4\,a^4b^3+a^3b^4}+\frac{2\left(ae^{(2\,c)}+4\,be^{(2\,c)}\right)\log\left(\left|e^{(2\,dx+2\,c)}-1\right|\right)}{a^4e^{(2\,c)}+4\,a^3be^{(2\,c)}+6\,a^2b^2e^{(2\,c)}+4\,ab^3e^{(2\,c)}+b^4e^{(2\,c)}}-\frac{2\,dx}{a^3}-\frac{a^5e^{(12\,d}}{}$$

36 Test file number 196

Test folder name:

`test_cases/7_Inverse_hyperbolic_functions/7.3_Inverse_hyperbolic_tangent/196_7.3.6_Exponentia`

36.1 Problem number 549

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\sqrt{c-\frac{c}{ax}}}\,dx$$

Optimal antiderivative

$$\frac{3\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\sqrt{c}} - \frac{2\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{a\sqrt{c}} - \frac{x\sqrt{c-\frac{c}{ax}}}{c}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a/x)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$ac\left(\frac{2\sqrt{2}\arctan\left(\frac{\sqrt{2}\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c} - \frac{3\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c} - \frac{\sqrt{\frac{acx-c}{ax}}}{a^2\left(c-\frac{acx-c}{ax}\right)c}\right)$$

36.2 Problem number 550

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{3}{2}}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{a\,c^{\frac{3}{2}}}-\frac{x\sqrt{c-\frac{c}{ax}}}{c^2}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a/x)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$ac\left(\frac{\sqrt{2}\,\arctan\left(\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^2}-\frac{\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^2}-\frac{\sqrt{\frac{acx-c}{ax}}}{a^2\left(c-\frac{acx-c}{ax}\right)c^2}\right)$$

36.3 Problem number 551

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{5}{2}}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{2a\,c^{\frac{5}{2}}}+\frac{2}{a\,c^2\sqrt{c-\frac{c}{ax}}}-\frac{x}{c^2\sqrt{c-\frac{c}{ax}}}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a/x)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{2}\,ac\left(\frac{\sqrt{2}\,\arctan\left(\frac{\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}}\right)}{a^2\sqrt{-c}\,c^3}+\frac{2\,\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^3}+\frac{2\left(c-\frac{2\,(acx-c)}{ax}\right)}{\left(c\sqrt{\frac{acx-c}{ax}}-\frac{(acx-c)\sqrt{\frac{acx-c}{ax}}}{ax}\right)a^2c^3}\right)$$

36.4 Problem number 552

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{4}{3a\,c^2\left(c-\frac{c}{ax}\right)^{\frac{3}{2}}}-\frac{x}{c^2\left(c-\frac{c}{ax}\right)^{\frac{3}{2}}}-\frac{3\,\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{7}{2}}}$$
$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{4a\,c^{\frac{7}{2}}}+\frac{7}{2a\,c^3\sqrt{c-\frac{c}{ax}}}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a/x)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{12}\,ac\left(\frac{2\left(2\,c+\frac{15\,(acx-c)}{ax}\right)x}{(acx-c)ac^4\sqrt{\frac{acx-c}{ax}}}+\frac{3\sqrt{2}\,\arctan\left(\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^4}+\frac{36\,\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^4}-\frac{12\sqrt{\frac{acx-c}{ax}}}{a^2\left(c-\frac{acx-c}{ax}\right)}\right.$$

36.5 Problem number 553

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{9/2}}\,dx$$

Optimal antiderivative

$$\frac{6}{5a\,c^2\left(c-\frac{c}{ax}\right)^{\frac{5}{2}}}+\frac{11}{6a\,c^3\left(c-\frac{c}{ax}\right)^{\frac{3}{2}}}-\frac{x}{c^2\left(c-\frac{c}{ax}\right)^{\frac{5}{2}}}-\frac{5\,\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{9}{2}}}$$
$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{8a\,c^{\frac{9}{2}}}+\frac{21}{4a\,c^4\sqrt{c-\frac{c}{ax}}}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a/x)^(9/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{120}\,ac\left(\frac{2\left(12\,c^2+\frac{50\,(acx-c)c}{ax}+\frac{255\,(acx-c)^2}{a^2x^2}\right)x^2}{(acx-c)^2c^5\sqrt{\frac{acx-c}{ax}}}+\frac{15\sqrt{2}\,\arctan\left(\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^5}+\frac{600\,\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^5}\right.$$

36.6 Problem number 728

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\sqrt{c-\frac{c}{a^2x^2}}}\,dx$$

Optimal antiderivative

$$\frac{(-ax+1)^2}{a^2x\sqrt{c-\frac{c}{a^2x^2}}}+\frac{2(-ax+1)(ax+1)}{a^2x\sqrt{c-\frac{c}{a^2x^2}}}+\frac{2\arcsin(ax)\sqrt{-ax+1}\sqrt{ax+1}}{a^2x\sqrt{c-\frac{c}{a^2x^2}}}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a^2/x^2)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{(ax+1)a^2\sqrt{c-\frac{2c}{ax+1}}+\frac{4a^2c\arctan\left(\frac{\sqrt{c-\frac{2c}{ax+1}}}{\sqrt{-c}}\right)}{\sqrt{-c}}+2a^2\sqrt{c-\frac{2c}{ax+1}}}{a^3\mathrm{csgn}\left(-\frac{1}{ax+1}+1\right)}$$

36.7 Problem number 729

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{(-ax+1)^2}{3a^2\left(c-\frac{c}{a^2x^2}\right)^{\frac{3}{2}}x}-\frac{2(-ax+1)^2(ax+1)(2ax+5)}{3a^4\left(c-\frac{c}{a^2x^2}\right)^{\frac{3}{2}}x^3}-\frac{2(-ax+1)^{\frac{3}{2}}(ax+1)^{\frac{3}{2}}\arcsin(ax)}{a^4\left(c-\frac{c}{a^2x^2}\right)^{\frac{3}{2}}x^3}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a^2/x^2)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{6\,(ax+1)a^2\sqrt{c-\frac{2\,c}{ax+1}}+\frac{24\,a^2c\arctan\left(\frac{\sqrt{c-\frac{2\,c}{ax+1}}}{\sqrt{-c}}\right)}{\sqrt{-c}}+\frac{a^2\left(c-\frac{2\,c}{ax+1}\right)^{\frac{3}{2}}c^2+15\,a^2\sqrt{c-\frac{2\,c}{ax+1}}\,c^3}{c^3}}{6\,a^3c^2\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}$$

36.8 Problem number 730

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{(-ax+1)^2}{a^2\left(c-\frac{c}{a^2x^2}\right)^{\frac{5}{2}}x}+\frac{2(-ax+1)^3}{5a^3\left(c-\frac{c}{a^2x^2}\right)^{\frac{5}{2}}x^2}-\frac{2(-ax+1)^3\,(ax+1)}{15a^4\left(c-\frac{c}{a^2x^2}\right)^{\frac{5}{2}}x^3}$$
$$+\frac{2(-ax+1)^3\,(ax+1)^2\,(13ax+28)}{15a^6\left(c-\frac{c}{a^2x^2}\right)^{\frac{5}{2}}x^5}+\frac{2(-ax+1)^{\frac{5}{2}}\,(ax+1)^{\frac{5}{2}}\arcsin(ax)}{a^6\left(c-\frac{c}{a^2x^2}\right)^{\frac{5}{2}}x^5}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a^2/x^2)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{4\arctan\left(\frac{\sqrt{c-\frac{2\,c}{ax+1}}}{\sqrt{-c}}\right)}{a\sqrt{-c}\,c^2\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}+\frac{8\,c-\frac{17\,c}{ax+1}}{4\left(\left(c-\frac{2\,c}{ax+1}\right)^{\frac{3}{2}}-\sqrt{c-\frac{2\,c}{ax+1}}\,c\right)ac^2\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}$$
$$-\frac{3\,a^4\left(c-\frac{2\,c}{ax+1}\right)^{\frac{5}{2}}c^{20}+35\,a^4\left(c-\frac{2\,c}{ax+1}\right)^{\frac{3}{2}}c^{21}+345\,a^4\sqrt{c-\frac{2\,c}{ax+1}}\,c^{22}}{120\,a^5c^{25}\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}$$

36.9 Problem number 731

$$\int \frac{e^{-2\tanh^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{(-ax+1)^2}{3a^2\left(c-\frac{c}{a^2x^2}\right)^{\frac{7}{2}}x}-\frac{10(-ax+1)^3}{3a^3\left(c-\frac{c}{a^2x^2}\right)^{\frac{7}{2}}x^2}-\frac{12(-ax+1)^4}{7a^4\left(c-\frac{c}{a^2x^2}\right)^{\frac{7}{2}}x^3}$$
$$-\frac{82(-ax+1)^4(ax+1)}{105a^5\left(c-\frac{c}{a^2x^2}\right)^{\frac{7}{2}}x^4}-\frac{2(-ax+1)^4(ax+1)^2}{35a^6\left(c-\frac{c}{a^2x^2}\right)^{\frac{7}{2}}x^5}$$
$$-\frac{2(-ax+1)^4(ax+1)^3(37ax+72)}{35a^8\left(c-\frac{c}{a^2x^2}\right)^{\frac{7}{2}}x^7}-\frac{2(-ax+1)^{\frac{7}{2}}(ax+1)^{\frac{7}{2}}\arcsin(ax)}{a^8\left(c-\frac{c}{a^2x^2}\right)^{\frac{7}{2}}x^7}$$

command

```
integrate(1/(a*x+1)^2*(-a^2*x^2+1)/(c-c/a^2/x^2)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{(ax+1)\sqrt{c-\frac{2c}{ax+1}}}{ac^4\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}-\frac{4\arctan\left(\frac{\sqrt{c-\frac{2c}{ax+1}}}{\sqrt{-c}}\right)}{a\sqrt{-c}\,c^3\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}+\frac{14c-\frac{27c}{ax+1}}{48a\left(c-\frac{2c}{ax+1}\right)^{\frac{3}{2}}c^3\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}$$
$$-\frac{15a^6\left(c-\frac{2c}{ax+1}\right)^{\frac{7}{2}}c^{42}+189a^6\left(c-\frac{2c}{ax+1}\right)^{\frac{5}{2}}c^{43}+1330a^6\left(c-\frac{2c}{ax+1}\right)^{\frac{3}{2}}c^{44}+10710a^6\sqrt{c-\frac{2c}{ax+1}}\,c^{45}}{3360a^7c^{49}\mathrm{sgn}\left(-\frac{1}{ax+1}+1\right)}$$

37 Test file number 197

Test folder name:

```
test_cases/7_Inverse_hyperbolic_functions/7.3_Inverse_hyperbolic_tangent/197_7.3.7_Inverse_hy
```

37.1 Problem number 5

$$\int \frac{\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{x^3}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{x\sqrt{e}}{\sqrt{e\,x^2+d}}\right)}{2x^2}-\frac{\sqrt{e}\,\sqrt{e\,x^2+d}}{2dx}$$

command

```
integrate(arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/x^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{e}{\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^2-d}-\frac{\log\left(-\frac{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}+1}{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}-1}\right)}{4\,x^2}$$

37.2 Problem number 6

$$\int \frac{\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{x^5}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{x\sqrt{e}}{\sqrt{e\,x^2+d}}\right)}{4x^4}+\frac{e^{\frac{3}{2}}\sqrt{e\,x^2+d}}{6d^2x}-\frac{\sqrt{e}\,\sqrt{e\,x^2+d}}{12d\,x^3}$$

command

```
integrate(arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/x^5,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(3\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^2de-d^2e\right)e}{3\left(\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^2-d\right)^3d}-\frac{\log\left(-\frac{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}+1}{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}-1}\right)}{8x^4}$$

37.3 Problem number 7

$$\int\frac{\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{x^7}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{x\sqrt{e}}{\sqrt{e\,x^2+d}}\right)}{6x^6}+\frac{2e^{\frac{3}{2}}\sqrt{e\,x^2+d}}{45d^2x^3}-\frac{4e^{\frac{5}{2}}\sqrt{e\,x^2+d}}{45d^3x}-\frac{\sqrt{e}\,\sqrt{e\,x^2+d}}{30d\,x^5}$$

command

```
integrate(arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/x^7,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{8\left(10\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^4d^2e^2-5\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^2d^3e^2+d^4e^2\right)e}{45\left(\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^2-d\right)^5d^2}-\frac{\log\left(-\frac{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}+1}{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}-1}\right)}{12x^6}$$

37.4 Problem number 8

$$\int \frac{\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{x^9}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{x\sqrt{e}}{\sqrt{e\,x^2+d}}\right)}{8x^8}+\frac{3e^{\frac{3}{2}}\sqrt{e\,x^2+d}}{140d^2x^5}-\frac{e^{\frac{5}{2}}\sqrt{e\,x^2+d}}{35d^3x^3}+\frac{2e^{\frac{7}{2}}\sqrt{e\,x^2+d}}{35d^4x}-\frac{\sqrt{e}\,\sqrt{e\,x^2+d}}{56d\,x^7}$$

command

```
integrate(arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/x^9,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\log\left(-\frac{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}+1}{\frac{xe^{\frac{1}{2}}}{\sqrt{x^2e+d}}-1}\right)}{16\,x^8}$$
$$+\frac{4\left(35\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^6d^3e^3-21\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^4d^4e^3+7\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^2d^5e^3-d^6e^3\right)e}{35\left(\left(xe^{\frac{1}{2}}-\sqrt{x^2e+d}\right)^2-d\right)^7d^3}$$

37.5 Problem number 24

$$\int x^{3/2}\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)\,dx$$

Optimal antiderivative

$$\frac{2x^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{x\sqrt{e}}{\sqrt{e\,x^2+d}}\right)}{5}-\frac{4x^{\frac{3}{2}}\sqrt{e\,x^2+d}}{25\sqrt{e}}+\frac{12d\sqrt{x}\ \sqrt{e\,x^2+d}}{25e\left(\sqrt{d}\ +x\sqrt{e}\right)}$$

$$-\frac{12d^{\frac{5}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)}{2}+\frac{1}{2}}\ \operatorname{EllipticE}\left(\sin\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{d}\ +x\sqrt{e}\right)\sqrt{\frac{e\,x^2+}{\left(\sqrt{d}\ +x\right.}}}{25\cos\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)e^{\frac{5}{4}}\sqrt{e\,x^2+d}}$$

$$+\frac{6d^{\frac{5}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)}{2}+\frac{1}{2}}\ \operatorname{EllipticF}\left(\sin\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{d}\ +x\sqrt{e}\right)\sqrt{\frac{e\,x^2+d}{\left(\sqrt{d}\ +x\sqrt{\right.}\right.}}}{25\cos\left(2\arctan\left(\frac{e^{\frac{1}{4}}\sqrt{x}}{d^{\frac{1}{4}}}\right)\right)e^{\frac{5}{4}}\sqrt{e\,x^2+d}}$$

command

```
integrate(x^(3/2)*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$+\infty$$

38 Test file number 199

Test folder name:

```
test_cases/7_Inverse_hyperbolic_functions/7.4_Inverse_hyperbolic_cotangent/199_7.4.2_Exponent
```

38.1 Problem number 2

$$\int e^{\coth^{-1}(ax)}x^2\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{2a^3}+\frac{2x\sqrt{1-\frac{1}{a^2x^2}}}{3a^2}+\frac{x^2\sqrt{1-\frac{1}{a^2x^2}}}{2a}+\frac{x^3\sqrt{1-\frac{1}{a^2x^2}}}{3}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)*x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{6}a\left(\frac{3\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^4}-\frac{3\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^4}+\frac{2\left(\frac{4\,(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-\frac{3\,(ax-1)^2\sqrt{\frac{ax-1}{ax+1}}}{(ax+1)^2}-9\sqrt{\frac{ax}{ax}}\right.}{a^4\left(\frac{ax-1}{ax+1}-1\right)^3}\right.$$

38.2 Problem number 18

$$\int e^{3\coth^{-1}(ax)}x^2\,dx$$

Optimal antiderivative

$$\frac{11\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{2a^3}-\frac{4\sqrt{1-\frac{1}{a^2x^2}}}{a^2\left(a-\frac{1}{x}\right)}+\frac{14x\sqrt{1-\frac{1}{a^2x^2}}}{3a^2}+\frac{3x^2\sqrt{1-\frac{1}{a^2x^2}}}{2a}+\frac{x^3\sqrt{1-\frac{1}{a^2x^2}}}{3}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{6}a\left(\frac{33\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^4}-\frac{33\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^4}-\frac{24}{a^4\sqrt{\frac{ax-1}{ax+1}}}+\frac{2\left(\frac{52\,(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-\frac{21\,(ax-1)^2}{(ax-}\right.\right.$$

38.3 Problem number 19

$$\int e^{3\coth^{-1}(ax)} x\,dx$$

Optimal antiderivative

$$\frac{9\,\mathrm{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{2a^2}-\frac{4\sqrt{1-\frac{1}{a^2x^2}}}{a\left(a-\frac{1}{x}\right)}+\frac{3x\sqrt{1-\frac{1}{a^2x^2}}}{a}+\frac{x^2\sqrt{1-\frac{1}{a^2x^2}}}{2}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*x,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{2}a\left(\frac{9\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^3}-\frac{9\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^3}-\frac{8}{a^3\sqrt{\frac{ax-1}{ax+1}}}-\frac{2\left(\frac{5\,(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-7\sqrt{\frac{ax-1}{ax+1}}\right.}{a^3\left(\frac{ax-1}{ax+1}-1\right)^2}\right.$$

38.4 Problem number 20

$$\int e^{3\coth^{-1}(ax)}\,dx$$

Optimal antiderivative

$$\frac{3\,\mathrm{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{a}-\frac{4\sqrt{1-\frac{1}{a^2x^2}}}{a-\frac{1}{x}}+x\sqrt{1-\frac{1}{a^2x^2}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$a\left(\frac{3\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2}-\frac{3\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2}-\frac{2\left(\frac{3(ax-1)}{ax+1}-2\right)}{a^2\left(\frac{(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-\sqrt{\frac{ax-1}{ax+1}}\right)}\right)$$

38.5 Problem number 21

$$\int \frac{e^{3\coth^{-1}(ax)}}{x}\,dx$$

Optimal antiderivative

$$\operatorname{arccsc}(ax)+\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)-\frac{4a\sqrt{1-\frac{1}{a^2x^2}}}{a-\frac{1}{x}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/x,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-a\left(\frac{2\arctan\left(\sqrt{\frac{ax-1}{ax+1}}\right)}{a}-\frac{\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a}+\frac{\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a}+\frac{4}{a\sqrt{\frac{ax-1}{ax+1}}}\right)$$

38.6 Problem number 22

$$\int \frac{e^{3\coth^{-1}(ax)}}{x^2}\,dx$$

Optimal antiderivative

$$3a\,\text{arccsc}(ax) - \frac{2\left(a+\frac{1}{x}\right)^2}{a\sqrt{1-\frac{1}{a^2x^2}}} - 3a\sqrt{1-\frac{1}{a^2x^2}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-2\,a\left(\frac{\frac{3\,(ax-1)}{ax+1}+2}{\frac{(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}+\sqrt{\frac{ax-1}{ax+1}}}+3\,\arctan\left(\sqrt{\frac{ax-1}{ax+1}}\right)\right)$$

38.7 Problem number 23

$$\int \frac{e^{3\coth^{-1}(ax)}}{x^3}\,dx$$

Optimal antiderivative

$$-\frac{a^5\left(1-\frac{1}{a^2x^2}\right)^{\frac{5}{2}}}{\left(a-\frac{1}{x}\right)^3} - \frac{3a^3\left(1-\frac{1}{a^2x^2}\right)^{\frac{3}{2}}}{2\left(a-\frac{1}{x}\right)} + \frac{9a^2\,\text{arccsc}(ax)}{2} - \frac{9a^2\sqrt{1-\frac{1}{a^2x^2}}}{2}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/x^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\left(9\,a\arctan\left(\sqrt{\frac{ax-1}{ax+1}}\right)+\frac{4\,a}{\sqrt{\frac{ax-1}{ax+1}}}+\frac{\frac{5\,(ax-1)a\sqrt{\frac{ax-1}{ax+1}}}{ax+1}+7\,a\sqrt{\frac{ax-1}{ax+1}}}{\left(\frac{ax-1}{ax+1}+1\right)^2}\right)a$$

38.8 Problem number 24

$$\int\frac{e^{3\coth^{-1}(ax)}}{x^4}\,dx$$

Optimal antiderivative

$$\frac{11a^3\operatorname{arccsc}(ax)}{2}-\frac{\left(a+\frac{1}{x}\right)^3}{\sqrt{1-\frac{1}{a^2x^2}}}-\frac{a\left(3a+\frac{1}{x}\right)^2\sqrt{1-\frac{1}{a^2x^2}}}{3}-\frac{a^2\left(28a+\frac{3}{x}\right)\sqrt{1-\frac{1}{a^2x^2}}}{6}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/x^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{3}\left(33\,a^2\arctan\left(\sqrt{\frac{ax-1}{ax+1}}\right)+\frac{12\,a^2}{\sqrt{\frac{ax-1}{ax+1}}}+\frac{\frac{52\,(ax-1)a^2\sqrt{\frac{ax-1}{ax+1}}}{ax+1}+\frac{21\,(ax-1)^2a^2\sqrt{\frac{ax-1}{ax+1}}}{(ax+1)^2}+39\,a^2\sqrt{\frac{ax-1}{ax+1}}}{\left(\frac{ax-1}{ax+1}+1\right)^3}\right)$$

38.9 Problem number 128

$$\int e^{\frac{1}{4}\coth^{-1}(ax)}\,dx$$

Optimal antiderivative

$$\left(1-\frac{1}{ax}\right)^{\frac{7}{8}}\left(1+\frac{1}{ax}\right)^{\frac{1}{8}}x+\frac{\arctan\left(\frac{(1+\frac{1}{ax})^{\frac{1}{8}}}{(1-\frac{1}{ax})^{\frac{1}{8}}}\right)}{2a}+\frac{\operatorname{arctanh}\left(\frac{(1+\frac{1}{ax})^{\frac{1}{8}}}{(1-\frac{1}{ax})^{\frac{1}{8}}}\right)}{2a}$$
$$-\frac{\arctan\left(1-\frac{(1+\frac{1}{ax})^{\frac{1}{8}}\sqrt{2}}{(1-\frac{1}{ax})^{\frac{1}{8}}}\right)\sqrt{2}}{4a}+\frac{\arctan\left(1+\frac{(1+\frac{1}{ax})^{\frac{1}{8}}\sqrt{2}}{(1-\frac{1}{ax})^{\frac{1}{8}}}\right)\sqrt{2}}{4a}$$
$$-\frac{\ln\left(1+\frac{(1+\frac{1}{ax})^{\frac{1}{4}}}{(1-\frac{1}{ax})^{\frac{1}{4}}}-\frac{(1+\frac{1}{ax})^{\frac{1}{8}}\sqrt{2}}{(1-\frac{1}{ax})^{\frac{1}{8}}}\right)\sqrt{2}}{8a}+\frac{\ln\left(1+\frac{(1+\frac{1}{ax})^{\frac{1}{4}}}{(1-\frac{1}{ax})^{\frac{1}{4}}}+\frac{(1+\frac{1}{ax})^{\frac{1}{8}}\sqrt{2}}{(1-\frac{1}{ax})^{\frac{1}{8}}}\right)\sqrt{2}}{8a}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/8),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{8}a\left(\frac{2\sqrt{2}\arctan\left(\frac{1}{2}\sqrt{2}\left(\sqrt{2}+2\left(\frac{ax-1}{ax+1}\right)^{\frac{1}{8}}\right)\right)}{a^2}+\frac{2\sqrt{2}\arctan\left(-\frac{1}{2}\sqrt{2}\left(\sqrt{2}-2\left(\frac{ax-1}{ax+1}\right)^{\frac{1}{8}}\right)\right)}{a^2}-\frac{\sqrt{2}\log\left(\sqrt{}\right.}{}\right.$$

38.10 Problem number 162

$$\int\frac{e^{\coth^{-1}(ax)}}{c-acx}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{ac}+\frac{2a+\frac{2}{x}}{a^2c\sqrt{1-\frac{1}{a^2x^2}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(-a*c*x+c),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-a\left(\frac{\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c}-\frac{\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c}-\frac{2}{a^2c\sqrt{\frac{ax-1}{ax+1}}}\right)$$

38.11 Problem number 227

$$\int e^{\coth^{-1}(ax)}(c-acx)^{7/2}\,dx$$

Optimal antiderivative

$$-\frac{8\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}(-acx+c)^{\frac{7}{2}}}{21a\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}}-\frac{568\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}(-acx+c)^{\frac{7}{2}}}{315a^3\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}x^2}$$
$$+\frac{48\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}(-acx+c)^{\frac{7}{2}}}{35a^2\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}x}+\frac{2\left(a-\frac{1}{x}\right)^3\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}x(-acx+c)^{\frac{7}{2}}}{9a^3\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)*(-a*c*x+c)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{256\sqrt{2}\sqrt{-c}\,c^3}{\mathrm{sgn}(c)}-\frac{35\,(acx+c)^4\sqrt{-acx-c}-270\,(acx+c)^3\sqrt{-acx-c}\,c+756\,(acx+c)^2\sqrt{-acx-c}\,c^2+840\,(-acx-c)^{\frac{3}{2}}c^3}{c\mathrm{sgn}(-acx-c)}\right)}{315\,a}$$

38.12 Problem number 229

$$\int e^{\coth^{-1}(ax)}(c-acx)^{3/2}\,dx$$

Optimal antiderivative

$$\frac{8a^2c^3\left(1-\frac{1}{a^2x^2}\right)^{\frac{3}{2}}x^3}{15\left(-acx+c\right)^{\frac{3}{2}}}+\frac{2a^2c^2\left(1-\frac{1}{a^2x^2}\right)^{\frac{3}{2}}x^3}{5\sqrt{-acx+c}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)*(-a*c*x+c)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{8\sqrt{2}\sqrt{-c}\,c}{\mathrm{sgn}(c)}-\frac{3\left(acx+c\right)^2\sqrt{-acx-c}+10\left(-acx-c\right)^{\frac{3}{2}}c}{c\mathrm{sgn}(-acx-c)}\right)}{15\,a}$$

38.13 Problem number 244

$$\int e^{3\coth^{-1}(ax)}(c-acx)^{7/2}\,dx$$

Optimal antiderivative

$$-\frac{44\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}\left(-acx+c\right)^{\frac{7}{2}}}{63a\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}}+\frac{214\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}\left(-acx+c\right)^{\frac{7}{2}}}{315a^2\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}x}+\frac{2\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}x\left(-acx+c\right)^{\frac{7}{2}}}{9\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\frac{128\sqrt{2}\sqrt{-c}\,c^3}{\mathrm{sgn}(c)}+\frac{35\left(acx+c\right)^4\sqrt{-acx-c}-180\left(acx+c\right)^3\sqrt{-acx-c}\,c+252\left(acx+c\right)^2\sqrt{-acx-c}\,c^2}{c\mathrm{sgn}(-acx-c)}\right)}{315\,a}$$

38.14 Problem number 246

$$\int e^{3\coth^{-1}(ax)}(c-acx)^{3/2}\,dx$$

Optimal antiderivative

$$\frac{2(ax+1)\left(-acx+c\right)^{\frac{3}{2}}}{5\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}a}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{2\left(\frac{4\sqrt{2}\sqrt{-c}\,c}{\mathrm{sgn}(c)}+\frac{(acx+c)^2\sqrt{-acx-c}}{c\mathrm{sgn}(-acx-c)}\right)}{5\,a}$$

38.15 Problem number 247

$$\int e^{3\coth^{-1}(ax)}\sqrt{c-acx}\,dx$$

Optimal antiderivative

$$\frac{2\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}x\sqrt{-acx+c}}{3\sqrt{1-\frac{1}{ax}}}+\frac{4\sqrt{1+\frac{1}{ax}}\,\sqrt{-acx+c}}{a\sqrt{1-\frac{1}{ax}}}$$
$$-\frac{4\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,\sqrt{\frac{1}{x}}}{\sqrt{a}\,\sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\,\sqrt{\frac{1}{x}}\,\sqrt{-acx+c}}{a^{\frac{3}{2}}\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{12i\sqrt{2}\sqrt{-c}\arctan(-i)-16\sqrt{2}\sqrt{-c}}{\mathrm{sgn}(c)}+\frac{2\left(6\sqrt{2}c^{\frac{3}{2}}\arctan\left(\frac{\sqrt{2}\sqrt{-acx-c}}{2\sqrt{c}}\right)+(-acx-c)^{\frac{3}{2}}-6\sqrt{-acx-c}c\right)}{c\mathrm{sgn}(-acx-c)}}{3a}$$

38.16 Problem number 296

$$\int e^{\coth^{-1}(ax)}x^2\sqrt{c-acx}\,dx$$

Optimal antiderivative

$$\frac{16\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}x\sqrt{-acx+c}}{105a^2\sqrt{1-\frac{1}{ax}}}-\frac{8\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}x^2\sqrt{-acx+c}}{35a\sqrt{1-\frac{1}{ax}}}+\frac{2\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}x^3\sqrt{-acx+c}}{7\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)*x^2*(-a*c*x+c)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(\frac{22\sqrt{2}\sqrt{-c}}{a^2\mathrm{sgn}(c)}+\frac{15(acx+c)^3\sqrt{-acx-c}-42(acx+c)^2\sqrt{-acx-c}c-35(-acx-c)^{\frac{3}{2}}c^2}{a^2c^3\mathrm{sgn}(-acx-c)}\right)}{105a}$$

38.17 Problem number 310

$$\int e^{3\coth^{-1}(ax)}x^3\sqrt{c-acx}\,dx$$

Optimal antiderivative

$$\frac{1576\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{315a^4\sqrt{1-\frac{1}{ax}}}+\frac{472x\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{315a^3\sqrt{1-\frac{1}{ax}}}$$
$$+\frac{92x^2\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{105a^2\sqrt{1-\frac{1}{ax}}}+\frac{38x^3\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{63a\sqrt{1-\frac{1}{ax}}}$$
$$+\frac{2x^4\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{9\sqrt{1-\frac{1}{ax}}}-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{\frac{1}{x}}}{\sqrt{a}\ \sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\ \sqrt{\frac{1}{x}}\ \sqrt{-acx+c}}{a^{\frac{9}{2}}\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*x^3*(-a*c*x+c)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{1260i\sqrt{2}\ \sqrt{-c}\ \arctan(-i)-2584\sqrt{2}\ \sqrt{-c}}{a^3\operatorname{sgn}(c)}+\frac{2\left(630\sqrt{2}\ c^{\frac{9}{2}}\arctan\left(\frac{\sqrt{2}\ \sqrt{-acx-c}}{2\sqrt{c}}\right)-35\,(acx+c)^4\sqrt{-acx-c}+45\,(acx+c)^3\right.}{a^3c^4\operatorname{sgn}}}{315\,a}$$

38.18 Problem number 312

$$\int e^{3\coth^{-1}(ax)}x\sqrt{c-acx}\ dx$$

Optimal antiderivative

$$\frac{2\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}x\sqrt{-acx+c}}{3a\sqrt{1-\frac{1}{ax}}}+\frac{2\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}x^2\sqrt{-acx+c}}{5\sqrt{1-\frac{1}{ax}}}+\frac{4\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{a^2\sqrt{1-\frac{1}{ax}}}$$
$$-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{\frac{1}{x}}}{\sqrt{a}\ \sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\ \sqrt{\frac{1}{x}}\ \sqrt{-acx+c}}{a^{\frac{5}{2}}\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*x*(-a*c*x+c)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{60i\sqrt{2}\sqrt{-c}\arctan(-i)-104\sqrt{2}\sqrt{-c}}{a\operatorname{sgn}(c)}+\frac{2\left(30\sqrt{2}c^{\frac{5}{2}}\arctan\left(\frac{\sqrt{2}\sqrt{-acx-c}}{2\sqrt{c}}\right)-3(acx+c)^2\sqrt{-acx-c}+5(-acx-c)^{\frac{3}{2}}c-30\right.}{ac^2\operatorname{sgn}(-acx-c)}}{15a}$$

38.19 Problem number 313

$$\int e^{3\coth^{-1}(ax)}\sqrt{c-acx}\,dx$$

Optimal antiderivative

$$\frac{2\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}x\sqrt{-acx+c}}{3\sqrt{1-\frac{1}{ax}}}+\frac{4\sqrt{1+\frac{1}{ax}}\sqrt{-acx+c}}{a\sqrt{1-\frac{1}{ax}}}-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{2}\sqrt{\frac{1}{x}}}{\sqrt{a}\sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\sqrt{\frac{1}{x}}\sqrt{-acx+c}}{a^{\frac{3}{2}}\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{12i\sqrt{2}\sqrt{-c}\arctan(-i)-16\sqrt{2}\sqrt{-c}}{\operatorname{sgn}(c)}+\frac{2\left(6\sqrt{2}c^{\frac{3}{2}}\arctan\left(\frac{\sqrt{2}\sqrt{-acx-c}}{2\sqrt{c}}\right)+(-acx-c)^{\frac{3}{2}}-6\sqrt{-acx-c}c\right)}{c\operatorname{sgn}(-acx-c)}}{3a}$$

38.20 Problem number 314

$$\int \frac{e^{3\coth^{-1}(ax)}\sqrt{c-acx}}{x}\,dx$$

Optimal antiderivative

$$\frac{2\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{\sqrt{1-\frac{1}{ax}}}+\frac{2\operatorname{arcsinh}\left(\frac{\sqrt{\frac{1}{x}}}{\sqrt{a}}\right)\sqrt{\frac{1}{x}}\ \sqrt{-acx+c}}{\sqrt{a}\ \sqrt{1-\frac{1}{ax}}}$$
$$-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{\frac{1}{x}}}{\sqrt{a}\ \sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\ \sqrt{\frac{1}{x}}\ \sqrt{-acx+c}}{\sqrt{a}\ \sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(1/2)/x,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-c\left(\frac{4\sqrt{2}\ \arctan\left(\frac{\sqrt{2}\ \sqrt{-acx-c}}{2\sqrt{c}}\right)}{\sqrt{c}\operatorname{sgn}\left(-acx-c\right)}-\frac{2\ \arctan\left(\frac{\sqrt{-acx-c}}{\sqrt{c}}\right)}{\sqrt{c}\operatorname{sgn}\left(-acx-c\right)}+\frac{-4i\sqrt{2}\ \arctan\left(-i\right)+2\sqrt{2}\ +2i\ \arctan\left(-\right.}{\sqrt{-c}\operatorname{sgn}\left(c\right)}\right.$$

38.21 Problem number 315

$$\int \frac{e^{3\coth^{-1}(ax)}\sqrt{c-acx}}{x^2}\,dx$$

Optimal antiderivative

$$\frac{\sqrt{1+\frac{1}{ax}}\ \sqrt{-acx+c}}{x\sqrt{1-\frac{1}{ax}}}+\frac{5\operatorname{arcsinh}\left(\frac{\sqrt{\frac{1}{x}}}{\sqrt{a}}\right)\sqrt{a}\ \sqrt{\frac{1}{x}}\ \sqrt{-acx+c}}{\sqrt{1-\frac{1}{ax}}}$$
$$-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{2}\ \sqrt{\frac{1}{x}}}{\sqrt{a}\ \sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\ \sqrt{a}\ \sqrt{\frac{1}{x}}\ \sqrt{-acx+c}}{\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(1/2)/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{4\sqrt{2}\ a^2\sqrt{c}\ \arctan\left(\frac{\sqrt{2}\ \sqrt{-acx-c}}{2\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}-\frac{5\,a^2\sqrt{c}\ \arctan\left(\frac{\sqrt{-acx-c}}{\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}-\frac{-4i\sqrt{2}\ a^2\sqrt{-c}\ \arctan(-i)+5i\,a^2\sqrt{-c}\ \arctan\left(-\right.}{\operatorname{sgn}(c)}$$
$$a$$

38.22 Problem number 316

$$\int \frac{e^{3\coth^{-1}(ax)}\sqrt{c-acx}}{x^3}\,dx$$

Optimal antiderivative

$$\frac{a\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{-acx+c}}{2x\sqrt{1-\frac{1}{ax}}}+\frac{7a\sqrt{1+\frac{1}{ax}}\sqrt{-acx+c}}{4x\sqrt{1-\frac{1}{ax}}}$$
$$+\frac{23a^{\frac{3}{2}}\operatorname{arcsinh}\left(\frac{\sqrt{\frac{1}{x}}}{\sqrt{a}}\right)\sqrt{\frac{1}{x}}\sqrt{-acx+c}}{4\sqrt{1-\frac{1}{ax}}}$$
$$-\frac{4a^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\sqrt{\frac{1}{x}}}{\sqrt{a}\sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\sqrt{\frac{1}{x}}\sqrt{-acx+c}}{\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(1/2)/x^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{16\sqrt{2}\,a^3\sqrt{c}\,\arctan\left(\frac{\sqrt{2}\sqrt{-acx-c}}{2\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}-\frac{23\,a^3\sqrt{c}\,\arctan\left(\frac{\sqrt{-acx-c}}{\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}+\frac{16i\sqrt{2}\,a^3\sqrt{-c}\,\arctan(-i)-23i\,a^3\sqrt{-c}\,\arctan}{\operatorname{sgn}(c)}}{4\,a}$$

38.23 Problem number 317

$$\int \frac{e^{3\coth^{-1}(ax)}\sqrt{c-acx}}{x^4}\,dx$$

Optimal antiderivative

$$\frac{a\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{-acx+c}}{3x^2\sqrt{1-\frac{1}{ax}}}+\frac{3a^2\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{-acx+c}}{4x\sqrt{1-\frac{1}{ax}}}$$
$$+\frac{13a^2\sqrt{1+\frac{1}{ax}}\sqrt{-acx+c}}{8x\sqrt{1-\frac{1}{ax}}}+\frac{45a^{\frac{5}{2}}\operatorname{arcsinh}\left(\frac{\sqrt{\frac{1}{x}}}{\sqrt{a}}\right)\sqrt{\frac{1}{x}}\sqrt{-acx+c}}{8\sqrt{1-\frac{1}{ax}}}$$
$$-\frac{4a^{\frac{5}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\sqrt{\frac{1}{x}}}{\sqrt{a}\sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\sqrt{\frac{1}{x}}\sqrt{-acx+c}}{\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(1/2)/x^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{96\sqrt{2}\,a^4\sqrt{c}\,\arctan\left(\frac{\sqrt{2}\sqrt{-acx-c}}{2\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}-\frac{135\,a^4\sqrt{c}\,\arctan\left(\frac{\sqrt{-acx-c}}{\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}+\frac{96i\sqrt{2}\,a^4\sqrt{-c}\,\arctan(-i)-135i\,a^4\sqrt{-c}\,\text{arct}}{\operatorname{sgn}(c)}$$
$$24\,a$$

38.24 Problem number 318

$$\int \frac{e^{3\coth^{-1}(ax)}\sqrt{c-acx}}{x^5}\,dx$$

Optimal antiderivative

$$\frac{a\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{-acx+c}}{4x^3\sqrt{1-\frac{1}{ax}}}+\frac{11a^2\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{-acx+c}}{24x^2\sqrt{1-\frac{1}{ax}}}+\frac{21a^3\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{-acx+c}}{32x\sqrt{1-\frac{1}{ax}}}$$
$$+\frac{107a^3\sqrt{1+\frac{1}{ax}}\sqrt{-acx+c}}{64x\sqrt{1-\frac{1}{ax}}}+\frac{363a^{\frac{7}{2}}\operatorname{arcsinh}\left(\frac{\sqrt{\frac{1}{x}}}{\sqrt{a}}\right)\sqrt{\frac{1}{x}}\sqrt{-acx+c}}{64\sqrt{1-\frac{1}{ax}}}$$
$$-\frac{4a^{\frac{7}{2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\sqrt{\frac{1}{x}}}{\sqrt{a}\sqrt{1+\frac{1}{ax}}}\right)\sqrt{2}\sqrt{\frac{1}{x}}\sqrt{-acx+c}}{\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)*(-a*c*x+c)^(1/2)/x^5,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{768\sqrt{2}\,a^5\sqrt{c}\,\arctan\left(\frac{\sqrt{2}\sqrt{-acx-c}}{2\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}-\frac{1089\,a^5\sqrt{c}\,\arctan\left(\frac{\sqrt{-acx-c}}{\sqrt{c}}\right)}{\operatorname{sgn}(-acx-c)}+\frac{768i\sqrt{2}\,a^5\sqrt{-c}\,\arctan(-i)-1089i\,a^5\sqrt{-c}}{\operatorname{sgn}(c)}$$

38.25 Problem number 383

$$\int\frac{e^{\coth^{-1}(ax)}}{c-\frac{c}{ax}}\,dx$$

Optimal antiderivative

$$\frac{2\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{ac}-\frac{2\left(a+\frac{1}{x}\right)}{a^2c\sqrt{1-\frac{1}{a^2x^2}}}+\frac{x\sqrt{1-\frac{1}{a^2x^2}}}{c}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(c-c/a/x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$2\,a\left(\frac{\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c}-\frac{\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c}-\frac{\frac{2\,(ax-1)}{ax+1}-1}{a^2c\left(\frac{(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-\sqrt{\frac{ax-1}{ax+1}}\right)}\right)$$

38.26 Problem number 384

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{4\left(a+\frac{1}{x}\right)}{3a^2c^2\left(1-\frac{1}{a^2x^2}\right)^{\frac{3}{2}}}+\frac{3\,\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{a\,c^2}+\frac{-9a-\frac{11}{x}}{3a^2c^2\sqrt{1-\frac{1}{a^2x^2}}}+\frac{x\sqrt{1-\frac{1}{a^2x^2}}}{c^2}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(c-c/a/x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{3}\,a\left(\frac{9\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^2}-\frac{9\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^2}-\frac{(ax+1)\left(\frac{12\,(ax-1)}{ax+1}+1\right)}{(ax-1)a^2c^2\sqrt{\frac{ax-1}{ax+1}}}-\frac{6\sqrt{\frac{ax-1}{ax+1}}}{a^2c^2\left(\frac{ax-1}{ax+1}-1\right)}\right)$$

38.27 Problem number 386

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^4}\,dx$$

Optimal antiderivative

$$-\frac{16\left(a+\frac{1}{x}\right)}{7a^2c^4\left(1-\frac{1}{a^2x^2}\right)^{\frac{7}{2}}}-\frac{4\left(7a+\frac{17}{x}\right)}{35a^2c^4\left(1-\frac{1}{a^2x^2}\right)^{\frac{5}{2}}}+\frac{-175a-\frac{307}{x}}{105a^2c^4\left(1-\frac{1}{a^2x^2}\right)^{\frac{3}{2}}}$$
$$+\frac{5\,\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{a\,c^4}+\frac{-525a-\frac{719}{x}}{105a^2c^4\sqrt{1-\frac{1}{a^2x^2}}}+\frac{x\sqrt{1-\frac{1}{a^2x^2}}}{c^4}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(c-c/a/x)^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{420}\,a\left(\frac{2100\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^4}-\frac{2100\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^4}-\frac{(ax+1)^3\left(\frac{126\,(ax-1)}{ax+1}+\frac{595\,(ax-1)^2}{(ax+1)^2}+\frac{3360\,(ax-\right.}{(ax-1)^3a^2c^4\sqrt{\frac{ax-1}{ax+1}}}\right.$$

38.28 Problem number 402

$$\int \frac{e^{3\coth^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{32\left(a+\frac{1}{x}\right)}{7a^2c^3\left(1-\frac{1}{a^2x^2}\right)^{\frac{7}{2}}}-\frac{2\left(7a+\frac{13}{x}\right)}{7a^2c^3\left(1-\frac{1}{a^2x^2}\right)^{\frac{3}{2}}}-\frac{16}{7a^2c^3\left(1-\frac{1}{a^2x^2}\right)^{\frac{5}{2}}x}$$
$$+\frac{6\,\operatorname{arctanh}\left(\sqrt{1-\frac{1}{a^2x^2}}\right)}{a\,c^3}+\frac{-42a-\frac{59}{x}}{7a^2c^3\sqrt{1-\frac{1}{a^2x^2}}}+\frac{x\sqrt{1-\frac{1}{a^2x^2}}}{c^3}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/(c-c/a/x)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{14}a\left(\frac{84\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^3}-\frac{84\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^3}-\frac{(ax+1)^3\left(\frac{7(ax-1)}{ax+1}+\frac{28(ax-1)^2}{(ax+1)^2}+\frac{140(ax-1)^3}{(ax+1)^3}+1\right)}{(ax-1)^3a^2c^3\sqrt{\frac{ax-1}{ax+1}}}\right.$$

38.29 Problem number 475

$$\int\frac{e^{-2\coth^{-1}(ax)}}{\sqrt{c-\frac{c}{ax}}}\,dx$$

Optimal antiderivative

$$-\frac{3\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\sqrt{c}}+\frac{2\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{a\sqrt{c}}+\frac{x\sqrt{c-\frac{c}{ax}}}{c}$$

command

```
integrate((a*x-1)/(a*x+1)/(c-c/a/x)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-ac\left(\frac{2\sqrt{2}\arctan\left(\frac{\sqrt{2}\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c}-\frac{3\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c}-\frac{\sqrt{\frac{acx-c}{ax}}}{a^2\left(c-\frac{acx-c}{ax}\right)c}\right.$$

38.30 Problem number 476

$$\int \frac{e^{-2\coth^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{3}{2}}}+\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{a\,c^{\frac{3}{2}}}+\frac{x\sqrt{c-\frac{c}{ax}}}{c^2}$$

command

```
integrate((a*x-1)/(a*x+1)/(c-c/a/x)^(3/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-ac\left(\frac{\sqrt{2}\,\arctan\left(\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^2}-\frac{\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^2}-\frac{\sqrt{\frac{acx-c}{ax}}}{a^2\left(c-\frac{acx-c}{ax}\right)c^2}\right)$$

38.31 Problem number 477

$$\int \frac{e^{-2\coth^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{5}{2}}}+\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{2a\,c^{\frac{5}{2}}}-\frac{2}{a\,c^2\sqrt{c-\frac{c}{ax}}}+\frac{x}{c^2\sqrt{c-\frac{c}{ax}}}$$

command

```
integrate((a*x-1)/(a*x+1)/(c-c/a/x)^(5/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{2}\,ac\left(\frac{\sqrt{2}\,\arctan\left(\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^3}+\frac{2\,\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^3}+\frac{2\left(c-\frac{2\,(acx-c)}{ax}\right)}{\left(c\sqrt{\frac{acx-c}{ax}}-\frac{(acx-c)\sqrt{\frac{acx-c}{ax}}}{ax}\right)a^2c^3}\right)$$

38.32 Problem number 478

$$\int \frac{e^{-2\coth^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{7/2}}\,dx$$

Optimal antiderivative

$$-\frac{4}{3a\,c^2\left(c-\frac{c}{ax}\right)^{\frac{3}{2}}}+\frac{x}{c^2\left(c-\frac{c}{ax}\right)^{\frac{3}{2}}}+\frac{3\,\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{7}{2}}}$$
$$+\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{4a\,c^{\frac{7}{2}}}-\frac{7}{2a\,c^3\sqrt{c-\frac{c}{ax}}}$$

command

```
integrate((a*x-1)/(a*x+1)/(c-c/a/x)^(7/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{12}\,ac\left(\frac{2\left(2\,c+\frac{15\,(acx-c)}{ax}\right)x}{(acx-c)ac^4\sqrt{\frac{acx-c}{ax}}}+\frac{3\sqrt{2}\,\arctan\left(\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^4}+\frac{36\,\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^4}-\frac{12\sqrt{\frac{acx-}{ax}}}{a^2\left(c-\frac{acx-c}{ax}\right.}\right.$$

38.33 Problem number 479

$$\int \frac{e^{-2\coth^{-1}(ax)}}{\left(c-\frac{c}{ax}\right)^{9/2}}\,dx$$

Optimal antiderivative

$$-\frac{6}{5a\,c^2\left(c-\frac{c}{ax}\right)^{\frac{5}{2}}}-\frac{11}{6a\,c^3\left(c-\frac{c}{ax}\right)^{\frac{3}{2}}}+\frac{x}{c^2\left(c-\frac{c}{ax}\right)^{\frac{5}{2}}}+\frac{5\,\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}}{\sqrt{c}}\right)}{a\,c^{\frac{9}{2}}}$$
$$+\frac{\operatorname{arctanh}\left(\frac{\sqrt{c-\frac{c}{ax}}\,\sqrt{2}}{2\sqrt{c}}\right)\sqrt{2}}{8a\,c^{\frac{9}{2}}}-\frac{21}{4a\,c^4\sqrt{c-\frac{c}{ax}}}$$

command

```
integrate((a*x-1)/(a*x+1)/(c-c/a/x)^(9/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{120}\,ac\left(\frac{2\left(12\,c^2+\frac{50\,(acx-c)c}{ax}+\frac{255\,(acx-c)^2}{a^2x^2}\right)x^2}{(acx-c)^2c^5\sqrt{\frac{acx-c}{ax}}}+\frac{15\sqrt{2}\,\arctan\left(\frac{\sqrt{2}\,\sqrt{\frac{acx-c}{ax}}}{2\sqrt{-c}}\right)}{a^2\sqrt{-c}\,c^5}+\frac{600\,\arctan\left(\frac{\sqrt{\frac{acx-c}{ax}}}{\sqrt{-c}}\right.}{a^2\sqrt{-c}\,c^5}\right.$$

38.34 Problem number 560

$$\int \frac{e^{\coth^{-1}(ax)}}{c - a^2 c x^2}\, dx$$

Optimal antiderivative

$$\frac{1}{\sqrt{\frac{ax-1}{ax+1}}\, ac}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(-a^2*c*x^2+c),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{ac\sqrt{\frac{ax-1}{ax+1}}}$$

38.35 Problem number 561

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c - a^2 c x^2\right)^2}\, dx$$

Optimal antiderivative

$$\frac{2}{3\sqrt{\frac{ax-1}{ax+1}}\, a\, c^2} - \frac{-2ax+1}{3\sqrt{\frac{ax-1}{ax+1}}\, a\, c^2 \left(-a^2x^2+1\right)}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(-a^2*c*x^2+c)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\frac{(ax+1)\left(\frac{6\,(ax-1)}{ax+1}-1\right)}{(ax-1)\sqrt{\frac{ax-1}{ax+1}}} + 3\sqrt{\frac{ax-1}{ax+1}}}{12\, ac^2}$$

38.36 Problem number 562

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c-a^2cx^2\right)^3}\,dx$$

Optimal antiderivative

$$\frac{8}{15\sqrt{\frac{ax-1}{ax+1}}\,a\,c^3}-\frac{-4ax+1}{15\sqrt{\frac{ax-1}{ax+1}}\,a\,c^3\left(-a^2x^2+1\right)^2}-\frac{4(-2ax+1)}{15\sqrt{\frac{ax-1}{ax+1}}\,a\,c^3\left(-a^2x^2+1\right)}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(-a^2*c*x^2+c)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{(ax+1)^2\left(\frac{20\,(ax-1)}{ax+1}-\frac{90\,(ax-1)^2}{(ax+1)^2}-3\right)}{(ax-1)^2\sqrt{\frac{ax-1}{ax+1}}}+\frac{5\,(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-60\sqrt{\frac{ax-1}{ax+1}}}{240\,ac^3}$$

38.37 Problem number 563

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c-a^2cx^2\right)^4}\,dx$$

Optimal antiderivative

$$\frac{16}{35\sqrt{\frac{ax-1}{ax+1}}\,a\,c^4}-\frac{-6ax+1}{35\sqrt{\frac{ax-1}{ax+1}}\,a\,c^4\left(-a^2x^2+1\right)^3}$$
$$-\frac{2(-4ax+1)}{35\sqrt{\frac{ax-1}{ax+1}}\,a\,c^4\left(-a^2x^2+1\right)^2}-\frac{8(-2ax+1)}{35\sqrt{\frac{ax-1}{ax+1}}\,a\,c^4\left(-a^2x^2+1\right)}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(-a^2*c*x^2+c)^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\frac{(ax+1)^3\left(\frac{42\,(ax-1)}{ax+1}-\frac{175\,(ax-1)^2}{(ax+1)^2}+\frac{700\,(ax-1)^3}{(ax+1)^3}-5\right)}{(ax-1)^3\sqrt{\frac{ax-1}{ax+1}}}-\frac{70\,(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}+\frac{7\,(ax-1)^2\sqrt{\frac{ax-1}{ax+1}}}{(ax+1)^2}+525\sqrt{\frac{ax-1}{ax+1}}}{2240\,ac^4}$$

38.38 Problem number 579

$$\int \frac{e^{3\coth^{-1}(ax)}}{\left(c-a^2cx^2\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{8}{35\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}a\,c^3}-\frac{-4ax+3}{7\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}a\,c^3\left(-a^2x^2+1\right)^2}+\frac{-\frac{24ax}{35}+\frac{36}{35}}{\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}a\,c^3\left(-a^2x^2+1\right)}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/(-a^2*c*x^2+c)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\frac{(ax+1)^3\left(\frac{28\,(ax-1)}{ax+1}-\frac{70\,(ax-1)^2}{(ax+1)^2}+\frac{140\,(ax-1)^3}{(ax+1)^3}-5\right)}{(ax-1)^3\sqrt{\frac{ax-1}{ax+1}}}+35\sqrt{\frac{ax-1}{ax+1}}}{560\,ac^3}$$

38.39 Problem number 580

$$\int \frac{e^{3\coth^{-1}(ax)}}{\left(c-a^2cx^2\right)^4}\,dx$$

Optimal antiderivative

$$-\frac{16}{63\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}ac^4}-\frac{-2ax+1}{9\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}ac^4\left(-a^2x^2+1\right)^3}$$
$$-\frac{10(-4ax+3)}{63\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}ac^4\left(-a^2x^2+1\right)^2}+\frac{-\frac{16ax}{21}+\frac{8}{7}}{\left(\frac{ax-1}{ax+1}\right)^{\frac{3}{2}}ac^4\left(-a^2x^2+1\right)}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/(-a^2*c*x^2+c)^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{(ax+1)^4\left(\frac{54(ax-1)}{ax+1}-\frac{189(ax-1)^2}{(ax+1)^2}+\frac{420(ax-1)^3}{(ax+1)^3}-\frac{945(ax-1)^4}{(ax+1)^4}-7\right)}{(ax-1)^4\sqrt{\frac{ax-1}{ax+1}}}+\frac{21(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-378\sqrt{\frac{ax-1}{ax+1}}$$
$$4032ac^4$$

38.40 Problem number 776

$$\int\frac{e^{\coth^{-1}(ax)}}{c-\frac{c}{a^2x^2}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\sqrt{1-\frac{1}{ax}}\sqrt{1+\frac{1}{ax}}\right)}{ac}-\frac{2\sqrt{1+\frac{1}{ax}}}{ac\sqrt{1-\frac{1}{ax}}}+\frac{x\sqrt{1+\frac{1}{ax}}}{c\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(c-c/a^2/x^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$a\left(\frac{\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c}-\frac{\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c}-\frac{\frac{3(ax-1)}{ax+1}-1}{a^2c\left(\frac{(ax-1)\sqrt{\frac{ax-1}{ax+1}}}{ax+1}-\sqrt{\frac{ax-1}{ax+1}}\right)}\right)$$

38.41 Problem number 777

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^2}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\sqrt{1-\frac{1}{ax}}\,\sqrt{1+\frac{1}{ax}}\right)}{a\,c^2}-\frac{4}{3a\,c^2\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{1+\frac{1}{ax}}}$$
$$+\frac{x}{c^2\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{1+\frac{1}{ax}}}-\frac{11}{3a\,c^2\sqrt{1-\frac{1}{ax}}\,\sqrt{1+\frac{1}{ax}}}+\frac{8\sqrt{1-\frac{1}{ax}}}{3a\,c^2\sqrt{1+\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(c-c/a^2/x^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{12}a\left(\frac{12\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^2}-\frac{12\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^2}-\frac{(ax+1)\left(\frac{18(ax-1)}{ax+1}+1\right)}{(ax-1)a^2c^2\sqrt{\frac{ax-1}{ax+1}}}+\frac{3\sqrt{\frac{ax-1}{ax+1}}}{a^2c^2}-\frac{24\sqrt{\frac{a}{a}}}{a^2c^2\left(\frac{ax}{ax}\right.}\right.$$

38.42 Problem number 778

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^3}\,dx$$

Optimal antiderivative

$$-\frac{6}{5a\,c^3\left(1-\frac{1}{ax}\right)^{\frac{5}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}-\frac{29}{15a\,c^3\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}$$
$$+\frac{x}{c^3\left(1-\frac{1}{ax}\right)^{\frac{5}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}+\frac{\operatorname{arctanh}\left(\sqrt{1-\frac{1}{ax}}\,\sqrt{1+\frac{1}{ax}}\right)}{a\,c^3}$$
$$-\frac{34}{5a\,c^3\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{1-\frac{1}{ax}}}+\frac{21\sqrt{1-\frac{1}{ax}}}{5a\,c^3\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}+\frac{16\sqrt{1-\frac{1}{ax}}}{5a\,c^3\sqrt{1+\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(c-c/a^2/x^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{240}\,a\left(\frac{240\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^3}-\frac{240\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^3}-\frac{(ax+1)^2\left(\frac{40\,(ax-1)}{ax+1}+\frac{450\,(ax-1)^2}{(ax+1)^2}+3\right)}{(ax-1)^2a^2c^3\sqrt{\frac{ax-1}{ax+1}}}-\frac{480}{a^2c^3\left(\right.}\right.$$

38.43 Problem number 779

$$\int \frac{e^{\coth^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^4}\,dx$$

Optimal antiderivative

$$-\frac{8}{7a\,c^4\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}}-\frac{11}{7a\,c^4\left(1-\frac{1}{ax}\right)^{\frac{5}{2}}\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}}-\frac{62}{21a\,c^4\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}}$$
$$+\frac{x}{c^4\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}}+\frac{\operatorname{arctanh}\left(\sqrt{1-\frac{1}{ax}}\,\sqrt{1+\frac{1}{ax}}\right)}{a\,c^4}$$
$$-\frac{269}{21a\,c^4\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}\sqrt{1-\frac{1}{ax}}}+\frac{262\sqrt{1-\frac{1}{ax}}}{35a\,c^4\left(1+\frac{1}{ax}\right)^{\frac{5}{2}}}+\frac{163\sqrt{1-\frac{1}{ax}}}{35a\,c^4\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}+\frac{128\sqrt{1-\frac{1}{ax}}}{35a\,c^4\sqrt{1+\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(1/2)/(c-c/a^2/x^2)^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{6720}\,a\left(\frac{6720\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^4}-\frac{6720\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^4}-\frac{5\,(ax+1)^3\left(\frac{42\,(ax-1)}{ax+1}+\frac{329\,(ax-1)^2}{(ax+1)^2}+\frac{2940\,(a}{(ax+}\right.\right.$$
$$\left.\left.\frac{}{(ax-1)^3a^2c^4\sqrt{\frac{ax-1}{ax+1}}}\right.\right.$$

38.44 Problem number 793

$$\int \frac{e^{3\coth^{-1}(ax)}}{c-\frac{c}{a^2x^2}}\,dx$$

Optimal antiderivative

$$\frac{3\operatorname{arctanh}\left(\sqrt{1-\frac{1}{ax}}\ \sqrt{1+\frac{1}{ax}}\right)}{ac}-\frac{5\sqrt{1+\frac{1}{ax}}}{3ac\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}}+\frac{x\sqrt{1+\frac{1}{ax}}}{c\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}}-\frac{14\sqrt{1+\frac{1}{ax}}}{3ac\sqrt{1-\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/(c-c/a^2/x^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{3}a\left(\frac{9\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c}-\frac{9\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c}-\frac{(ax+1)\left(\frac{12\,(ax-1)}{ax+1}+1\right)}{(ax-1)a^2c\sqrt{\frac{ax-1}{ax+1}}}-\frac{6\sqrt{\frac{ax-1}{ax+1}}}{a^2c\left(\frac{ax-1}{ax+1}-1\right)}\right)$$

38.45 Problem number 795

$$\int \frac{e^{3\coth^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^3}\,dx$$

Optimal antiderivative

$$\frac{3\operatorname{arctanh}\left(\sqrt{1-\frac{1}{ax}}\ \sqrt{1+\frac{1}{ax}}\right)}{a\,c^3}-\frac{8}{7a\,c^3\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}\sqrt{1+\frac{1}{ax}}}$$
$$-\frac{53}{35a\,c^3\left(1-\frac{1}{ax}\right)^{\frac{5}{2}}\sqrt{1+\frac{1}{ax}}}-\frac{88}{35a\,c^3\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{1+\frac{1}{ax}}}$$
$$+\frac{x}{c^3\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}\sqrt{1+\frac{1}{ax}}}-\frac{281}{35a\,c^3\sqrt{1-\frac{1}{ax}}\ \sqrt{1+\frac{1}{ax}}}+\frac{176\sqrt{1-\frac{1}{ax}}}{35a\,c^3\sqrt{1+\frac{1}{ax}}}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/(c-c/a^2/x^2)^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{560}a\left(\frac{1680\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^3}-\frac{1680\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^3}-\frac{(ax+1)^3\left(\frac{56\,(ax-1)}{ax+1}+\frac{350\,(ax-1)^2}{(ax+1)^2}+\frac{2520\,(ax-1)}{(ax+1)^3}\right.}{(ax-1)^3a^2c^3\sqrt{\frac{ax-1}{ax+1}}}\right.$$

38.46 Problem number 796

$$\int\frac{e^{3\coth^{-1}(ax)}}{\left(c-\frac{c}{a^2x^2}\right)^4}\,dx$$

Optimal antiderivative

$$\begin{aligned}&-\frac{10}{9a\,c^4\left(1-\frac{1}{ax}\right)^{\frac{9}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}-\frac{29}{21a\,c^4\left(1-\frac{1}{ax}\right)^{\frac{7}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}\\&-\frac{208}{105a\,c^4\left(1-\frac{1}{ax}\right)^{\frac{5}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}-\frac{1147}{315a\,c^4\left(1-\frac{1}{ax}\right)^{\frac{3}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}\\&+\frac{x}{c^4\left(1-\frac{1}{ax}\right)^{\frac{9}{2}}\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}+\frac{3\,\operatorname{arctanh}\left(\sqrt{1-\frac{1}{ax}}\,\sqrt{1+\frac{1}{ax}}\right)}{a\,c^4}\\&-\frac{1462}{105a\,c^4\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}\sqrt{1-\frac{1}{ax}}}+\frac{2609\sqrt{1-\frac{1}{ax}}}{315a\,c^4\left(1+\frac{1}{ax}\right)^{\frac{3}{2}}}+\frac{1664\sqrt{1-\frac{1}{ax}}}{315a\,c^4\sqrt{1+\frac{1}{ax}}}\end{aligned}$$

command

```
integrate(1/((a*x-1)/(a*x+1))^(3/2)/(c-c/a^2/x^2)^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{20160}a\left(\frac{60480\log\left(\sqrt{\frac{ax-1}{ax+1}}+1\right)}{a^2c^4}-\frac{60480\log\left(\left|\sqrt{\frac{ax-1}{ax+1}}-1\right|\right)}{a^2c^4}-\frac{(ax+1)^4\left(\frac{450(ax-1)}{ax+1}+\frac{2961(ax-1)^2}{(ax+1)^2}+\frac{14}{(ax-1)^4a^2c^4\sqrt{}}\right.\right.$$

39 Test file number 201

Test folder name:

`test_cases/7_Inverse_hyperbolic_functions/7.5_Inverse_hyperbolic_secant/201_7.5.2_Inverse_hyp`

39.1 Problem number 71

$$\int \frac{e^{2\operatorname{sech}^{-1}(ax)}}{x^2}\,dx$$

Optimal antiderivative

$$-\frac{4a}{3\left(1-\sqrt{\frac{-ax+1}{ax+1}}\right)^3}+\frac{2a}{\left(1-\sqrt{\frac{-ax+1}{ax+1}}\right)^2}$$

command

```
integrate((1/a/x+(1/a/x-1)^(1/2)*(1+1/a/x)^(1/2))^2/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{3\left(a^2+\frac{a}{x}\right)a^2-\left(9a^2+\left(a^2+\frac{a}{x}\right)\left(\frac{2\left(a^2+\frac{a}{x}\right)}{a^2}-7\right)\right)\sqrt{a^2+\frac{a}{x}}\sqrt{-a^2+\frac{a}{x}}+3\left(2a^2-\frac{a}{x}\right)\sqrt{a^2+\frac{a}{x}}\sqrt{-a^2+\frac{a}{x}}-\frac{2a}{x^3}}{3a^3}$$

39.2 Problem number 82

$$\int \frac{e^{-\operatorname{sech}^{-1}(ax)}}{x^2}\,dx$$

Optimal antiderivative

$$-a\operatorname{arctanh}\left(\sqrt{\frac{-ax+1}{ax+1}}\right)-\frac{a}{\left(1+\sqrt{\frac{-ax+1}{ax+1}}\right)^2}+\frac{a}{1+\sqrt{\frac{-ax+1}{ax+1}}}$$

command

```
integrate(1/(1/a/x+(1/a/x-1)^(1/2)*(1+1/a/x)^(1/2))/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{2}\left(\sqrt{a^2+\frac{a}{x}}\,\sqrt{-a^2+\frac{a}{x}}\left(\frac{1}{a^2}-\frac{a^2+\frac{a}{x}}{a^4}\right)-\frac{2\left(a^2+\frac{a}{x}\right)a^2-\left(a^2+\frac{a}{x}\right)^2}{a^4}-2\log\left(\sqrt{a^2+\frac{a}{x}}-\sqrt{-a^2+\frac{a}{x}}\right)\right)a$$

40 Test file number 204

Test folder name:

```
test_cases/8_Special_functions/204_8.1_Error_functions
```

40.1 Problem number 46

$$\int (ex)^m \operatorname{Erf}(d(a+b\log(cx^n)))\,dx$$

Optimal antiderivative

$$\frac{(ex)^{1+m}\operatorname{erf}(d(a+b\ln(cx^n)))}{e(1+m)}+\frac{e^{\frac{(1+m)\left(-4abd^2n+m+1\right)}{4b^2d^2n^2}}x(ex)^m\operatorname{erf}\left(\frac{1+m-2abd^2n-2b^2d^2n\ln(cx^n)}{2bdn}\right)(cx^n)^{-\frac{1+m}{n}}}{1+m}$$

command

```
integrate((e*x)^m*erf(d*(a+b*log(c*x^n))),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{x^{m+1}\operatorname{erf}\left(bdn\log\left(x\right)+bd\log\left(c\right)+ad\right)e^{m}}{m+1}$$
$$+\frac{\pi\operatorname{erf}\left(-bdn\log\left(x\right)-bd\log\left(c\right)-ad+\frac{m}{2\,bdn}+\frac{1}{2\,bdn}\right)e^{\left(m-\frac{am}{bn}-\frac{a}{bn}+\frac{m^2}{4\,b^2d^2n^2}+\frac{m}{2\,b^2d^2n^2}+\frac{1}{4\,b^2d^2n^2}\right)}}{(\pi+\pi m)c^{\frac{m}{n}}c^{\left(\frac{1}{n}\right)}}$$

40.2 Problem number 149

$$\int(ex)^{m}\mathrm{Erfc}(d(a+b\log\left(cx^{n}\right)))\,dx$$

Optimal antiderivative

$$-\frac{\mathrm{e}^{\frac{(1+m)\left(-4ab\,d^2n+m+1\right)}{4b^2d^2n^2}}x(ex)^{m}\operatorname{erf}\left(\frac{1+m-2ab\,d^2n-2b^2d^2n\ln(c\,x^{n})}{2bdn}\right)(c\,x^{n})^{-\frac{1+m}{n}}}{1+m}$$
$$+\frac{(ex)^{1+m}\operatorname{erfc}(d(a+b\ln(c\,x^{n})))}{e\,(1+m)}$$

command

```
integrate((e*x)^m*erfc(d*(a+b*log(c*x^n))),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{xx^{m}\operatorname{erf}\left(bdn\log\left(x\right)+bd\log\left(c\right)+ad\right)e^{m}}{m+1}+\frac{xx^{m}e^{m}}{m+1}$$
$$-\frac{\pi\operatorname{erf}\left(-bdn\log\left(x\right)-bd\log\left(c\right)-ad+\frac{m}{2\,bdn}+\frac{1}{2\,bdn}\right)e^{\left(m-\frac{am}{bn}-\frac{a}{bn}+\frac{m^2}{4\,b^2d^2n^2}+\frac{m}{2\,b^2d^2n^2}+\frac{1}{4\,b^2d^2n^2}\right)}}{(\pi+\pi m)c^{\frac{m}{n}}c^{\left(\frac{1}{n}\right)}}$$

41 Test file number 206

Test folder name:

`test_cases/8_Special_functions/206_8.4_Trig_integral_functions`

41.1 Problem number 70

$$\int x^3 \text{CosIntegral}(bx)\, dx$$

Optimal antiderivative

$$\frac{x^4\, \text{cosineIntegral}(bx)}{4} + \frac{3\cos(bx)}{2b^4} - \frac{3x^2\cos(bx)}{4b^2} + \frac{3x\sin(bx)}{2b^3} - \frac{x^3\sin(bx)}{4b}$$

command

```
integrate(x^3*fresnel_cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}\, x^4\, \text{Ci}\left(bx\right) - \frac{3\left(b^2x^2-2\right)\cos\left(bx\right)}{4\, b^4} - \frac{\left(b^3x^3-6\, bx\right)\sin\left(bx\right)}{4\, b^4}$$

41.2 Problem number 71

$$\int x^2 \text{CosIntegral}(bx)\, dx$$

Optimal antiderivative

$$\frac{x^3\, \text{cosineIntegral}(bx)}{3} - \frac{2x\cos(bx)}{3b^2} + \frac{2\sin(bx)}{3b^3} - \frac{x^2\sin(bx)}{3b}$$

command

```
integrate(x^2*fresnel_cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{3}\, x^3\, \text{Ci}\left(bx\right) - \frac{2\, x\cos\left(bx\right)}{3\, b^2} - \frac{\left(b^2x^2-2\right)\sin\left(bx\right)}{3\, b^3}$$

41.3 Problem number 72

$$\int x\text{CosIntegral}(bx)\,dx$$

Optimal antiderivative

$$\frac{x^2\,\text{cosineIntegral}(bx)}{2}-\frac{\cos(bx)}{2b^2}-\frac{x\sin(bx)}{2b}$$

command

```
integrate(x*fresnel_cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{2}\,x^2\,\text{Ci}\left(bx\right)-\frac{x\sin\left(bx\right)}{2\,b}-\frac{\cos\left(bx\right)}{2\,b^2}$$

41.4 Problem number 73

$$\int \text{CosIntegral}(bx)\,dx$$

Optimal antiderivative

$$x\,\text{cosineIntegral}(bx)-\frac{\sin(bx)}{b}$$

command

```
integrate(fresnel_cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$x\,\text{Ci}\left(bx\right)-\frac{\sin\left(bx\right)}{b}$$

41.5 Problem number 75

$$\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx$$

Optimal antiderivative

$$-\frac{\text{cosineIntegral}(bx)}{x} - \frac{\cos(bx)}{x} - b\,\text{sinIntegral}(bx)$$

command

```
integrate(fresnel_cos(b*x)/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{bx\Im(\text{Ci}\,(bx))\tan\left(\frac{1}{2}\,bx\right)^2 - bx\Im(\text{Ci}\,(-bx))\tan\left(\frac{1}{2}\,bx\right)^2 + 2\,bx\,\text{Si}\,(bx)\tan\left(\frac{1}{2}\,bx\right)^2 + bx\Im(\text{Ci}\,(bx)) - bx\Im(\text{Ci}\,(-bx)) +}{2\left(x\tan\left(\frac{1}{2}\,bx\right)^2 + x\right)}$$

$$-\frac{\text{Ci}\,(bx)}{x}$$

41.6 Problem number 76

$$\int \frac{\text{CosIntegral}(bx)}{x^3}\,dx$$

Optimal antiderivative

$$-\frac{b^2\,\text{cosineIntegral}(bx)}{4} - \frac{\text{cosineIntegral}(bx)}{2x^2} - \frac{\cos(bx)}{4x^2} + \frac{b\sin(bx)}{4x}$$

command

```
integrate(fresnel_cos(b*x)/x^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{b^2x^2\,\text{Ci}\,(bx) + b^2x^2\,\text{Ci}\,(-bx) - 2\,bx\sin\,(bx) + 2\,\cos\,(bx)}{8\,x^2} - \frac{\text{Ci}\,(bx)}{2\,x^2}$$

41.7 Problem number 78

$$\int x^3 \text{CosIntegral}(bx)^2\,dx$$

Optimal antiderivative

$$\frac{x^2}{4b^2}+\frac{x^4\,\text{cosineIntegral}(bx)^2}{4}-\frac{3\,\text{cosineIntegral}(2bx)}{2b^4}+\frac{3\,\text{cosineIntegral}(bx)\cos(bx)}{b^4}$$
$$-\frac{3x^2\,\text{cosineIntegral}(bx)\cos(bx)}{2b^2}+\frac{3\left(\cos^2(bx)\right)}{8b^4}-\frac{3\ln(x)}{2b^4}+\frac{3x\,\text{cosineIntegral}(bx)\sin(bx)}{b^3}$$
$$-\frac{x^3\,\text{cosineIntegral}(bx)\sin(bx)}{2b}+\frac{x\cos(bx)\sin(bx)}{b^3}-\frac{13\left(\sin^2(bx)\right)}{8b^4}+\frac{x^2\left(\sin^2(bx)\right)}{4b^2}$$

command

```
integrate(x^3*fresnel_cos(b*x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}x^4\,\text{Ci}(bx)^2-\frac{1}{2}\left(\frac{3\left(b^2x^2-2\right)\cos(bx)}{b^4}+\frac{\left(b^3x^3-6\,bx\right)\sin(bx)}{b^4}\right)\text{Ci}(bx)$$
$$-\frac{b^2x^2\cos(2\,bx)-3\,b^2x^2-4\,bx\sin(2\,bx)-8\,\cos(2\,bx)+6\,\text{Ci}(2\,bx)+6\,\text{Ci}(-2\,bx)+12\,\log(x)}{8\,b^4}$$

41.8 Problem number 79

$$\int x^2 \text{CosIntegral}(bx)^2\,dx$$

Optimal antiderivative

$$\frac{x}{2b^2}+\frac{x^3\,\text{cosineIntegral}(bx)^2}{3}-\frac{4x\,\text{cosineIntegral}(bx)\cos(bx)}{3b^2}$$
$$-\frac{2\,\text{sinIntegral}(2bx)}{3b^3}+\frac{4\,\text{cosineIntegral}(bx)\sin(bx)}{3b^3}$$
$$-\frac{2x^2\,\text{cosineIntegral}(bx)\sin(bx)}{3b}+\frac{5\cos(bx)\sin(bx)}{6b^3}+\frac{x\left(\sin^2(bx)\right)}{3b^2}$$

command

```
integrate(x^2*fresnel_cos(b*x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{3}\,x^3\,\mathrm{Ci}\left(bx\right)^2-\frac{2}{3}\left(\frac{2\,x\cos\left(bx\right)}{b^2}+\frac{\left(b^2x^2-2\right)\sin\left(bx\right)}{b^3}\right)\mathrm{Ci}\left(bx\right)$$
$$+\frac{5\,bx\tan\left(bx\right)^2-2\,\Im(\mathrm{Ci}\left(2\,bx\right))\tan\left(bx\right)^2+2\,\Im(\mathrm{Ci}\left(-2\,bx\right))\tan\left(bx\right)^2-4\,\mathrm{Si}\left(2\,bx\right)\tan\left(bx\right)^2+3\,bx-2\,\Im(\mathrm{Ci}\left(2\,bx\right))}{6\left(b^3\tan\left(bx\right)^2+b^3\right)}$$

41.9 Problem number 80

$$\int x\mathrm{CosIntegral}(bx)^2\,dx$$

Optimal antiderivative

$$\frac{x^2\,\mathrm{cosineIntegral}(bx)^2}{2}+\frac{\mathrm{cosineIntegral}(2bx)}{2b^2}-\frac{\mathrm{cosineIntegral}(bx)\cos(bx)}{b^2}$$
$$+\frac{\ln(x)}{2b^2}-\frac{x\,\mathrm{cosineIntegral}(bx)\sin(bx)}{b}+\frac{\sin^2(bx)}{2b^2}$$

command

```
integrate(x*fresnel_cos(b*x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{2}\,x^2\,\mathrm{Ci}\left(bx\right)^2-\left(\frac{x\sin\left(bx\right)}{b}+\frac{\cos\left(bx\right)}{b^2}\right)\mathrm{Ci}\left(bx\right)-\frac{\cos\left(2\,bx\right)-\mathrm{Ci}\left(2\,bx\right)-\mathrm{Ci}\left(-2\,bx\right)-2\,\log\left(x\right)}{4\,b^2}$$

41.10 Problem number 81

$$\int \mathrm{CosIntegral}(bx)^2\,dx$$

Optimal antiderivative

$$x\,\mathrm{cosineIntegral}(bx)^2+\frac{\mathrm{sinIntegral}(2bx)}{b}-\frac{2\,\mathrm{cosineIntegral}(bx)\sin(bx)}{b}$$

command

```
integrate(fresnel_cos(b*x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$x\,\mathrm{Ci}\left(bx\right)^2-\frac{2\,\mathrm{Ci}\left(bx\right)\sin\left(bx\right)}{b}+\frac{\Im(\mathrm{Ci}\left(2\,bx\right))-\Im(\mathrm{Ci}\left(-2\,bx\right))+2\,\mathrm{Si}\left(2\,bx\right)}{2\,b}$$

41.11 Problem number 86

$$\int x^3\mathrm{CosIntegral}(a+bx)\,dx$$

Optimal antiderivative

$$\begin{aligned}&-\frac{a^4\,\mathrm{cosineIntegral}(bx+a)}{4b^4}+\frac{x^4\,\mathrm{cosineIntegral}(bx+a)}{4}+\frac{3\cos(bx+a)}{2b^4}\\&-\frac{a^2\cos(bx+a)}{4b^4}+\frac{ax\cos(bx+a)}{2b^3}-\frac{3x^2\cos(bx+a)}{4b^2}-\frac{a\sin(bx+a)}{2b^4}+\frac{a^3\sin(bx+a)}{4b^4}\\&+\frac{3x\sin(bx+a)}{2b^3}-\frac{a^2x\sin(bx+a)}{4b^3}+\frac{a\,x^2\sin(bx+a)}{4b^2}-\frac{x^3\sin(bx+a)}{4b}\end{aligned}$$

command

```
integrate(x^3*fresnel_cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}\,x^4\,\mathrm{Ci}\left(bx+a\right)$$
$$-\frac{a^4\cos\left(a\right)^2\,\mathrm{Ci}\left(bx+a\right)+a^4\cos\left(a\right)^2\,\mathrm{Ci}\left(-bx-a\right)+2\,b^3x^3\sin\left(bx+a\right)+a^4\,\mathrm{Ci}\left(bx+a\right)\sin\left(a\right)^2+a^4\,\mathrm{Ci}\left(-bx-a\right)\s$$

41.12 Problem number 87

$$\int x^2 \text{CosIntegral}(a+bx)\,dx$$

Optimal antiderivative

$$\frac{a^3\,\text{cosineIntegral}(bx+a)}{3b^3}+\frac{x^3\,\text{cosineIntegral}(bx+a)}{3}+\frac{a\cos(bx+a)}{3b^3}$$
$$-\frac{2x\cos(bx+a)}{3b^2}+\frac{2\sin(bx+a)}{3b^3}-\frac{a^2\sin(bx+a)}{3b^3}+\frac{ax\sin(bx+a)}{3b^2}-\frac{x^2\sin(bx+a)}{3b}$$

command

```
integrate(x^2*fresnel_cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{3}x^3\,\text{Ci}\left(bx+a\right)$$
$$+\frac{a^3\cos\left(a\right)^2\text{Ci}\left(bx+a\right)+a^3\cos\left(a\right)^2\text{Ci}\left(-bx-a\right)+a^3\,\text{Ci}\left(bx+a\right)\sin\left(a\right)^2+a^3\,\text{Ci}\left(-bx-a\right)\sin\left(a\right)^2-2\,b^2x^2\sin\left(b\right.}{6\,b^3}$$

41.13 Problem number 88

$$\int x\,\text{CosIntegral}(a+bx)\,dx$$

Optimal antiderivative

$$-\frac{a^2\,\text{cosineIntegral}(bx+a)}{2b^2}+\frac{x^2\,\text{cosineIntegral}(bx+a)}{2}-\frac{\cos(bx+a)}{2b^2}+\frac{a\sin(bx+a)}{2b^2}-\frac{x\sin(bx+a)}{2b}$$

command

```
integrate(x*fresnel_cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{2}x^2\,\text{Ci}\left(bx+a\right)$$
$$-\frac{a^2\cos\left(a\right)^2\text{Ci}\left(bx+a\right)+a^2\cos\left(a\right)^2\text{Ci}\left(-bx-a\right)+a^2\,\text{Ci}\left(bx+a\right)\sin\left(a\right)^2+a^2\,\text{Ci}\left(-bx-a\right)\sin\left(a\right)^2+2\,bx\sin\left(bx\right.}{4\,b^2}$$

41.14 Problem number 89

$$\int \text{CosIntegral}(a+bx)\,dx$$

Optimal antiderivative

$$\frac{(bx+a)\,\text{cosineIntegral}(bx+a)}{b} - \frac{\sin(bx+a)}{b}$$

command

```
integrate(fresnel_cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$x\,\text{Ci}\left(bx+a\right) + \frac{a\cos\left(a\right)^2\,\text{Ci}\left(bx+a\right) + a\cos\left(a\right)^2\,\text{Ci}\left(-bx-a\right) + a\,\text{Ci}\left(bx+a\right)\sin\left(a\right)^2 + a\,\text{Ci}\left(-bx-a\right)\sin\left(a\right)^2 - 2\,\cos\left(a\right)\sin\left(bx\right.}{2\,b}$$

41.15 Problem number 91

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2}\,dx$$

Optimal antiderivative

$$-\frac{b\,\text{cosineIntegral}(bx+a)}{a} - \frac{\text{cosineIntegral}(bx+a)}{x} + \frac{b\,\text{cosineIntegral}(bx)\cos(a)}{a} - \frac{b\,\text{sinIntegral}(bx)\sin(a)}{a}$$

command

```
integrate(fresnel_cos(b*x+a)/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\left(\Re(\text{Ci}\left(bx+a\right))\tan\left(\tfrac{1}{2}\,a\right)^2 + \Re(\text{Ci}\left(bx\right))\tan\left(\tfrac{1}{2}\,a\right)^2 + \Re(\text{Ci}\left(-bx-a\right))\tan\left(\tfrac{1}{2}\,a\right)^2 + \Re(\text{Ci}\left(-bx\right))\tan\left(\tfrac{1}{2}\,a\right)^2 + 2\,\Im(\right.}{2}$$

$$-\frac{\text{Ci}\left(bx+a\right)}{x}$$

41.16 Problem number 92

$$\int \frac{\text{CosIntegral}(a+bx)}{x^3}\,dx$$

Optimal antiderivative

$$\frac{b^2\,\text{cosineIntegral}(bx+a)}{2a^2} - \frac{\text{cosineIntegral}(bx+a)}{2x^2} - \frac{b^2\,\text{cosineIntegral}(bx)\cos(a)}{2a^2} - \frac{b\cos(bx+a)}{2ax} - \frac{b^2\cos(a)\,\text{sinIntegral}(bx)}{2a} - \frac{b^2\,\text{cosineIntegral}(bx)\sin(a)}{2a} + \frac{b^2\,\text{sinIntegral}(bx)\sin(a)}{2a^2}$$

command

```
integrate(fresnel_cos(b*x+a)/x^3,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

output too large to display

41.17 Problem number 103

$$\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x}\,dx$$

Optimal antiderivative

$$\frac{\text{cosineIntegral}(d(a+b\ln(c\,x^n)))\,(a+b\ln(c\,x^n))}{bn} - \frac{\sin(d(a+b\ln(c\,x^n)))}{bdn}$$

command

```
integrate(fresnel_cos(d*(a+b*log(c*x^n)))/x,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{(bdn\log(x)+bd\log(c)+ad)\,\text{Ci}(bdn\log(x)+bd\log(c)+ad) - \sin(bdn\log(x)+bd\log(c)+ad)}{bdn}$$

41.18 Problem number 110

$$\int \text{CosIntegral}(bx)\sin(bx)\,dx$$

Optimal antiderivative

$$\frac{\text{cosineIntegral}(2bx)}{2b} - \frac{\text{cosineIntegral}(bx)\cos(bx)}{b} + \frac{\ln(x)}{2b}$$

command

```
integrate(fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\cos(bx)\,\text{Ci}(bx)}{b} + \frac{\text{Ci}(2\,bx) + \text{Ci}(-2\,bx) + 2\,\log(x)}{4\,b}$$

41.19 Problem number 111

$$\int x\text{CosIntegral}(bx)\sin(bx)\,dx$$

Optimal antiderivative

$$\frac{x}{2b} - \frac{x\,\text{cosineIntegral}(bx)\cos(bx)}{b} - \frac{\text{sinIntegral}(2bx)}{2b^2} + \frac{\text{cosineIntegral}(bx)\sin(bx)}{b^2} + \frac{\cos(bx)\sin(bx)}{2b^2}$$

command

```
integrate(x*fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\left(\frac{x\cos(bx)}{b} - \frac{\sin(bx)}{b^2}\right)\text{Ci}(bx)$$
$$+\frac{2\,bx\tan(bx)^2 - \Im(\text{Ci}(2\,bx))\tan(bx)^2 + \Im(\text{Ci}(-2\,bx))\tan(bx)^2 - 2\,\text{Si}(2\,bx)\tan(bx)^2 + 2\,bx - \Im(\text{Ci}(2\,bx)) + \Im($$
$$4\left(b^2\tan(bx)^2 + b^2\right)$$

41.20 Problem number 112

$$\int x^2 \text{CosIntegral}(bx) \sin(bx)\, dx$$

Optimal antiderivative

$$\frac{x^2}{4b} - \frac{\text{cosineIntegral}(2bx)}{b^3} + \frac{2\,\text{cosineIntegral}(bx)\cos(bx)}{b^3} - \frac{x^2\,\text{cosineIntegral}(bx)\cos(bx)}{b} + \frac{\cos^2(bx)}{4b^3} - \frac{\ln(x)}{b^3} + \frac{2x\,\text{cosineIntegral}(bx)\sin(bx)}{b^2} + \frac{x\cos(bx)\sin(bx)}{2b^2} - \frac{\sin^2(bx)}{b^3}$$

command

```
integrate(x^2*fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{2\,x\sin(bx)}{b^2} - \frac{(b^2x^2-2)\cos(bx)}{b^3}\right)\text{Ci}(bx) + \frac{2\,b^2x^2 + 2\,bx\sin(2\,bx) + 5\,\cos(2\,bx) - 4\,\text{Ci}(2\,bx) - 4\,\text{Ci}(-2\,bx) - 8\,\log(x)}{8\,b^3}$$

41.21 Problem number 113

$$\int x^3 \text{CosIntegral}(bx) \sin(bx)\, dx$$

Optimal antiderivative

$$-\frac{5x}{2b^3} + \frac{x^3}{6b} + \frac{6x\,\text{cosineIntegral}(bx)\cos(bx)}{b^3} - \frac{x^3\,\text{cosineIntegral}(bx)\cos(bx)}{b} + \frac{x\left(\cos^2(bx)\right)}{2b^3} + \frac{3\,\text{sinIntegral}(2bx)}{b^4} - \frac{6\,\text{cosineIntegral}(bx)\sin(bx)}{b^4} + \frac{3x^2\,\text{cosineIntegral}(bx)\sin(bx)}{b^2} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{3x\left(\sin^2(bx)\right)}{2b^3}$$

command

```
integrate(x^3*fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\left(\frac{\left(b^3x^3-6\,bx\right)\cos\left(bx\right)}{b^4}-\frac{3\left(b^2x^2-2\right)\sin\left(bx\right)}{b^4}\right)\mathrm{Ci}\left(bx\right)$$
$$+\frac{b^3x^3\tan\left(bx\right)^2+b^3x^3+3\,b^2x^2\tan\left(bx\right)-24\,bx\tan\left(bx\right)^2+9\,\Im(\mathrm{Ci}\left(2\,bx\right))\tan\left(bx\right)^2-9\,\Im(\mathrm{Ci}\left(-2\,bx\right))\tan\left(bx\right)^2+1}{6\left(b^4\tan\left(bx\right)^2+b^4\right)}$$

41.22 Problem number 117

$$\int \cos(bx)\mathrm{CosIntegral}(bx)\,dx$$

Optimal antiderivative

$$-\frac{\mathrm{sinIntegral}(2bx)}{2b}+\frac{\mathrm{cosineIntegral}(bx)\sin(bx)}{b}$$

command

```
integrate(fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\mathrm{Ci}\left(bx\right)\sin\left(bx\right)}{b}-\frac{\Im(\mathrm{Ci}\left(2\,bx\right))-\Im(\mathrm{Ci}\left(-2\,bx\right))+2\,\mathrm{Si}\left(2\,bx\right)}{4\,b}$$

41.23 Problem number 118

$$\int x\cos(bx)\mathrm{CosIntegral}(bx)\,dx$$

Optimal antiderivative

$$-\frac{\mathrm{cosineIntegral}(2bx)}{2b^2}+\frac{\mathrm{cosineIntegral}(bx)\cos(bx)}{b^2}-\frac{\ln(x)}{2b^2}+\frac{x\,\mathrm{cosineIntegral}(bx)\sin(bx)}{b}-\frac{\sin^2(bx)}{2b^2}$$

command

```
integrate(x*fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{x\sin\left(bx\right)}{b}+\frac{\cos\left(bx\right)}{b^2}\right)\mathrm{Ci}\left(bx\right)+\frac{\cos\left(2\,bx\right)-\mathrm{Ci}\left(2\,bx\right)-\mathrm{Ci}\left(-2\,bx\right)-2\,\log\left(x\right)}{4\,b^2}$$

41.24 Problem number 119

$$\int x^2 \cos(bx)\text{CosIntegral}(bx)\,dx$$

Optimal antiderivative

$$-\frac{3x}{4b^2}+\frac{2x\,\text{cosineIntegral}(bx)\cos(bx)}{b^2}+\frac{\text{sinIntegral}(2bx)}{b^3}-\frac{2\,\text{cosineIntegral}(bx)\sin(bx)}{b^3}$$
$$+\frac{x^2\,\text{cosineIntegral}(bx)\sin(bx)}{b}-\frac{5\cos(bx)\sin(bx)}{4b^3}-\frac{x\left(\sin^2(bx)\right)}{2b^2}$$

command

```
integrate(x^2*fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{2\,x\cos(bx)}{b^2}+\frac{\left(b^2x^2-2\right)\sin(bx)}{b^3}\right)\text{Ci}(bx)$$
$$-\frac{5\,bx\tan(bx)^2-2\,\Im(\text{Ci}(2\,bx))\tan(bx)^2+2\,\Im(\text{Ci}(-2\,bx))\tan(bx)^2-4\,\text{Si}(2\,bx)\tan(bx)^2+3\,bx-2\,\Im(\text{Ci}(2\,bx))}{4\left(b^3\tan(bx)^2+b^3\right)}$$

41.25 Problem number 120

$$\int x^3 \cos(bx)\text{CosIntegral}(bx)\,dx$$

Optimal antiderivative

$$-\frac{x^2}{2b^2}+\frac{3\,\text{cosineIntegral}(2bx)}{b^4}-\frac{6\,\text{cosineIntegral}(bx)\cos(bx)}{b^4}$$
$$+\frac{3x^2\,\text{cosineIntegral}(bx)\cos(bx)}{b^2}-\frac{3\left(\cos^2(bx)\right)}{4b^4}+\frac{3\ln(x)}{b^4}-\frac{6x\,\text{cosineIntegral}(bx)\sin(bx)}{b^3}$$
$$+\frac{x^3\,\text{cosineIntegral}(bx)\sin(bx)}{b}-\frac{2x\cos(bx)\sin(bx)}{b^3}+\frac{13\left(\sin^2(bx)\right)}{4b^4}-\frac{x^2\left(\sin^2(bx)\right)}{2b^2}$$

command

```
integrate(x^3*fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{3\left(b^2x^2-2\right)\cos\left(bx\right)}{b^4}+\frac{\left(b^3x^3-6\,bx\right)\sin\left(bx\right)}{b^4}\right)\mathrm{Ci}\left(bx\right)$$
$$+\frac{b^2x^2\cos\left(2\,bx\right)-3\,b^2x^2-4\,bx\sin\left(2\,bx\right)-8\,\cos\left(2\,bx\right)+6\,\mathrm{Ci}\left(2\,bx\right)+6\,\mathrm{Ci}\left(-2\,bx\right)+12\,\log\left(x\right)}{4\,b^4}$$

41.26 Problem number 121

$$\int \mathrm{CosIntegral}(2x)\sin(5x)\,dx$$

Optimal antiderivative

$$\frac{\mathrm{cosineIntegral}(3x)}{10}+\frac{\mathrm{cosineIntegral}(7x)}{10}-\frac{\mathrm{cosineIntegral}(2x)\cos(5x)}{5}$$

command

```
integrate(fresnel_cos(2*x)*sin(5*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{5}\,\cos\left(5\,x\right)\mathrm{Ci}\left(2\,x\right)+\frac{1}{10}\,\mathrm{Ci}\left(7\,x\right)+\frac{1}{10}\,\mathrm{Ci}\left(3\,x\right)$$

41.27 Problem number 122

$$\int \cos(5x)\mathrm{CosIntegral}(2x)\,dx$$

Optimal antiderivative

$$-\frac{\mathrm{sinIntegral}(3x)}{10}-\frac{\mathrm{sinIntegral}(7x)}{10}+\frac{\mathrm{cosineIntegral}(2x)\sin(5x)}{5}$$

command

```
integrate(fresnel_cos(2*x)*cos(5*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{5}\,\mathrm{Ci}\left(2\,x\right)\sin\left(5\,x\right)-\frac{1}{10}\,\mathrm{Si}\left(7\,x\right)-\frac{1}{10}\,\mathrm{Si}\left(3\,x\right)$$

41.28 Problem number 123

$$\int x^2 \text{CosIntegral}(a+bx)\sin(a+bx)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{ax}{2b^2}+\frac{x^2}{4b}-\frac{\text{cosineIntegral}(2bx+2a)}{b^3}+\frac{a^2\,\text{cosineIntegral}(2bx+2a)}{2b^3}\\
&+\frac{2\,\text{cosineIntegral}(bx+a)\cos(bx+a)}{b^3}-\frac{x^2\,\text{cosineIntegral}(bx+a)\cos(bx+a)}{b}\\
&+\frac{\cos^2(bx+a)}{4b^3}+\frac{\cos(2bx+2a)}{2b^3}-\frac{\ln(bx+a)}{b^3}+\frac{a^2\ln(bx+a)}{2b^3}\\
&+\frac{a\,\text{sinIntegral}(2bx+2a)}{b^3}+\frac{2x\,\text{cosineIntegral}(bx+a)\sin(bx+a)}{b^2}\\
&-\frac{a\cos(bx+a)\sin(bx+a)}{2b^3}+\frac{x\cos(bx+a)\sin(bx+a)}{2b^2}
\end{aligned}$$

command

```
integrate(x^2*fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{2\,x\sin(bx+a)}{b^2}-\frac{\left(b^2x^2-2\right)\cos(bx+a)}{b^3}\right)\text{Ci}(bx+a)$$
$$+\frac{2\,b^2x^2\tan(bx+a)^2-4\,abx\tan(bx+a)^2+4\,a^2\log(|bx+a|)\tan(bx+a)^2+2\,a^2\Re(\text{Ci}(2\,bx+2\,a))\tan(bx+a)^2}$$

41.29 Problem number 124

$$\int x\,\text{CosIntegral}(a+bx)\sin(a+bx)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{x}{2b}-\frac{a\,\text{cosineIntegral}(2bx+2a)}{2b^2}-\frac{x\,\text{cosineIntegral}(bx+a)\cos(bx+a)}{b}-\frac{a\ln(bx+a)}{2b^2}\\
&-\frac{\text{sinIntegral}(2bx+2a)}{2b^2}+\frac{\text{cosineIntegral}(bx+a)\sin(bx+a)}{b^2}+\frac{\cos(bx+a)\sin(bx+a)}{2b^2}
\end{aligned}$$

command

```
integrate(x*fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\left(\frac{x\cos\left(bx+a\right)}{b}-\frac{\sin\left(bx+a\right)}{b^2}\right)\operatorname{Ci}\left(bx+a\right)$$
$$+\frac{2\,bx\tan\left(bx\right)^2\tan\left(a\right)^2-2\,a\log\left(\left|bx+a\right|\right)\tan\left(bx\right)^2\tan\left(a\right)^2-a\Re(\operatorname{Ci}\left(2\,bx+2\,a\right))\tan\left(bx\right)^2\tan\left(a\right)^2-a\Re(\operatorname{Ci}\left(-2\,b$$

41.30 Problem number 125

$$\int \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx$$

Optimal antiderivative

$$\frac{\operatorname{cosineIntegral}(2bx+2a)}{2b}-\frac{\operatorname{cosineIntegral}(bx+a)\cos(bx+a)}{b}+\frac{\ln(bx+a)}{2b}$$

command

```
integrate(fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\cos\left(bx+a\right)\operatorname{Ci}\left(bx+a\right)}{b}$$
$$+\frac{\cos\left(2\,a\right)^2\operatorname{Ci}\left(2\,bx+2\,a\right)+\cos\left(2\,a\right)^2\operatorname{Ci}\left(-2\,bx-2\,a\right)+\operatorname{Ci}\left(2\,bx+2\,a\right)\sin\left(2\,a\right)^2+\operatorname{Ci}\left(-2\,bx-2\,a\right)\sin\left(2\,a\right)^2+2\ \mathrm{lo}}{4\,b}$$

41.31 Problem number 127

$$\int x^2 \cos(a+bx)\text{CosIntegral}(a+bx)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{x}{b^2}+\frac{a\,\text{cosineIntegral}(2bx+2a)}{b^3}+\frac{2x\,\text{cosineIntegral}(bx+a)\cos(bx+a)}{b^2}\\
&-\frac{a\cos(2bx+2a)}{4b^3}+\frac{x\cos(2bx+2a)}{4b^2}+\frac{a\ln(bx+a)}{b^3}+\frac{\text{sinIntegral}(2bx+2a)}{b^3}\\
&-\frac{a^2\,\text{sinIntegral}(2bx+2a)}{2b^3}-\frac{2\,\text{cosineIntegral}(bx+a)\sin(bx+a)}{b^3}\\
&+\frac{x^2\,\text{cosineIntegral}(bx+a)\sin(bx+a)}{b}-\frac{\cos(bx+a)\sin(bx+a)}{b^3}-\frac{\sin(2bx+2a)}{8b^3}
\end{aligned}$$

command

```
integrate(x^2*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{2\,x\cos\left(bx+a\right)}{b^2}+\frac{\left(b^2x^2-2\right)\sin\left(bx+a\right)}{b^3}\right)\text{Ci}\left(bx+a\right)$$
$$-\frac{a^2\Im(\text{Ci}\left(2\,bx+2\,a\right))\tan\left(bx+a\right)^2-a^2\Im(\text{Ci}\left(-2\,bx-2\,a\right))\tan\left(bx+a\right)^2+2\,a^2\,\text{Si}\left(2\,bx+2\,a\right)\tan\left(bx+a\right)^2+5\,bx$$

41.32 Problem number 128

$$\int x\cos(a+bx)\text{CosIntegral}(a+bx)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{\text{cosineIntegral}(2bx+2a)}{2b^2}+\frac{\text{cosineIntegral}(bx+a)\cos(bx+a)}{b^2}+\frac{\cos(2bx+2a)}{4b^2}\\
&-\frac{\ln(bx+a)}{2b^2}+\frac{a\,\text{sinIntegral}(2bx+2a)}{2b^2}+\frac{x\,\text{cosineIntegral}(bx+a)\sin(bx+a)}{b}
\end{aligned}$$

command

```
integrate(x*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(\frac{x\sin\left(bx+a\right)}{b}+\frac{\cos\left(bx+a\right)}{b^{2}}\right)\operatorname{Ci}\left(bx+a\right)$$
$$+\frac{a\Im(\operatorname{Ci}\left(2\,bx+2\,a\right))\tan\left(bx\right)^{2}\tan\left(a\right)^{2}-a\Im(\operatorname{Ci}\left(-2\,bx-2\,a\right))\tan\left(bx\right)^{2}\tan\left(a\right)^{2}+2\,a\operatorname{Si}\left(2\,bx+2\,a\right)\tan\left(bx\right)^{2}\tan\left(a\right.}{}$$

41.33 Problem number 129

$$\int\cos(a+bx)\text{CosIntegral}(a+bx)\,dx$$

Optimal antiderivative

$$-\frac{\text{sinIntegral}(2bx+2a)}{2b}+\frac{\text{cosineIntegral}(bx+a)\sin(bx+a)}{b}$$

command

```
integrate(fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\operatorname{Ci}\left(bx+a\right)\sin\left(bx+a\right)}{b}-\frac{\Im(\operatorname{Ci}\left(2\,bx+2\,a\right))-\Im(\operatorname{Ci}\left(-2\,bx-2\,a\right))+2\,\operatorname{Si}\left(2\,bx+2\,a\right)}{4\,b}$$

41.34 Problem number 132

$$\int\text{CosIntegral}(c+dx)\sin(a+bx)\,dx$$

Optimal antiderivative

$$\frac{\text{cosineIntegral}\left(\frac{c(b-d)}{d}+(b-d)\,x\right)\cos\left(a-\frac{bc}{d}\right)}{2b}$$
$$+\frac{\text{cosineIntegral}\left(\frac{c(b+d)}{d}+(b+d)\,x\right)\cos\left(a-\frac{bc}{d}\right)}{2b}-\frac{\text{cosineIntegral}(dx+c)\cos(bx+a)}{b}$$
$$-\frac{\text{sinIntegral}\left(\frac{c(b-d)}{d}+(b-d)\,x\right)\sin\left(a-\frac{bc}{d}\right)}{2b}-\frac{\text{sinIntegral}\left(\frac{c(b+d)}{d}+(b+d)\,x\right)\sin\left(a-\frac{bc}{d}\right)}{2b}$$

command

```
integrate(fresnel_cos(d*x+c)*sin(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

output too large to display

41.35 Problem number 135

$$\int \cos(a+bx)\text{CosIntegral}(c+dx)\,dx$$

Optimal antiderivative

$$-\frac{\cos\left(a-\frac{bc}{d}\right)\text{sinIntegral}\left(\frac{c(b-d)}{d}+(b-d)\,x\right)}{2b}-\frac{\cos\left(a-\frac{bc}{d}\right)\text{sinIntegral}\left(\frac{c(b+d)}{d}+(b+d)\,x\right)}{2b}$$
$$-\frac{\text{cosineIntegral}\left(\frac{c(b-d)}{d}+(b-d)\,x\right)\sin\left(a-\frac{bc}{d}\right)}{2b}$$
$$-\frac{\text{cosineIntegral}\left(\frac{c(b+d)}{d}+(b+d)\,x\right)\sin\left(a-\frac{bc}{d}\right)}{2b}+\frac{\text{cosineIntegral}(dx+c)\sin(bx+a)}{b}$$

command

```
integrate(fresnel_cos(d*x+c)*cos(b*x+a),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

output too large to display

42 Test file number 209

Test folder name:

`test_cases/209_Blake_problems`

42.1 Problem number 403

$$\int \frac{1}{\sqrt[4]{1+x^4}}\,dx$$

Optimal antiderivative

$$\frac{\arctan\left(\frac{x}{(x^4+1)^{\frac{1}{4}}}\right)}{2}+\frac{\operatorname{arctanh}\left(\frac{x}{(x^4+1)^{\frac{1}{4}}}\right)}{2}$$

command

```
integrate(1/(x^4+1)^(1/4),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{2}\arctan\left(\frac{\left(x^4+1\right)^{\frac{1}{4}}}{x}\right)+\frac{1}{4}\log\left(\frac{\left(x^4+1\right)^{\frac{1}{4}}}{x}+1\right)-\frac{1}{4}\log\left(\frac{\left(x^4+1\right)^{\frac{1}{4}}}{x}-1\right)$$

42.2 Problem number 1081

$$\int \frac{1+x}{\sqrt{-7+4x+14x^2-12x^3+x^4}}\,dx$$

Optimal antiderivative

$$\arctan\left(\frac{-4+4x}{1-2x+x^2-\sqrt{x^4-12x^3+14x^2+4x-7}}\right)+\ln(-1+x)$$
$$-\ln\left(-5+6x-x^2+\sqrt{x^4-12x^3+14x^2+4x-7}\right)$$

command

```
integrate((1+x)/(x^4-12*x^3+14*x^2+4*x-7)^(1/2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: NotImplementedError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{\arctan\left(\frac{1}{7}\sqrt{7}\left(\sqrt{2}+\frac{3\left(\sqrt{7}\sqrt{-\frac{10}{x}-\frac{7}{x^2}+1}-4\sqrt{2}\right)}{\frac{7}{x}+5}\right)\right)}{\operatorname{sgn}\left(-\frac{1}{x^2}+\frac{1}{x^3}\right)}-\frac{\log\left(\left|10\sqrt{7}+40\sqrt{2}+\frac{50\left(\sqrt{7}\sqrt{-\frac{10}{x}-\frac{7}{x^2}+1}-4\sqrt{2}\right)}{\frac{7}{x}+5}\right|\right)}{\operatorname{sgn}\left(-\frac{1}{x^2}+\frac{1}{x^3}\right)}+\frac{\log\left(\left|-2\sqrt{7}+8\sqrt{2}+\frac{10\left(\sqrt{7}\sqrt{-\frac{10}{x}-\frac{7}{x^2}+1}-4\sqrt{2}\right)}{\frac{7}{x}+5}\right|\right)}{\operatorname{sgn}\left(-\frac{1}{x^2}+\frac{1}{x^3}\right)}$$

42.3 Problem number 1123

$$\int \frac{\sqrt{1-4x+x^2}+\left(1-4x+x^2\right)^{3/2}}{\sqrt{1-4x+x^2}+\left(1-4x+x^2\right)^{3/2}-\left(1-4x+x^2\right)^{5/2}}\,dx$$

Optimal antiderivative

Unintegrable

command

```
integrate(((x^2-4*x+1)^(1/2)+(x^2-4*x+1)^(3/2))/((x^2-4*x+1)^(1/2)+(x^2-4*x+1)^(3/2)-
(x^2-4*x+1)^(5/2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{\left(\left(\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)^2+4\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-6\right)\log\left(x+\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)}{2\left(2\left(\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)^3+12\left(\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)^2+17\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-32\right)}$$
$$-\frac{\left(\left(\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}+2\right)^2-4\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-6\right)\log\left(x-\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)}{2\left(2\left(\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}+2\right)^3-12\left(\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}+2\right)^2+17\sqrt{\frac{1}{2}\sqrt{5}+\frac{7}{2}}+32\right)}$$
$$+\frac{\left(\left(\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)^2+4\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-6\right)\log\left(x+\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)}{2\left(2\left(\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)^3+12\left(\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)^2+17\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-32\right)}$$
$$-\frac{\left(\left(\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}+2\right)^2-4\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-6\right)\log\left(x-\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}-2\right)}{2\left(2\left(\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}+2\right)^3-12\left(\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}+2\right)^2+17\sqrt{-\frac{1}{2}\sqrt{5}+\frac{7}{2}}+32\right)}$$

42.4 Problem number 1648

$$\int \frac{1}{\sqrt[4]{-1-3x^4-2x^8+2x^{12}+3x^{16}+x^{20}}}\,dx$$

Optimal antiderivative

$$-\frac{\arctan\left(\frac{\left(x^{20}+3x^{16}+2x^{12}-2x^8-3x^4-1\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2x\left(x^4+1\right)}\right)2^{\frac{3}{4}}}{4}+\frac{\operatorname{arctanh}\left(\frac{\left(x^{20}+3x^{16}+2x^{12}-2x^8-3x^4-1\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2x\left(x^4+1\right)}\right)2^{\frac{3}{4}}}{4}$$

command

```
integrate(1/(x^20+3*x^16+2*x^12-2*x^8-3*x^4-1)^(1/4),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}\cdot 2^{\frac{3}{4}}\arctan\left(\frac{2^{\frac{3}{4}}\left(x^4-1\right)^{\frac{1}{4}}}{2\,x}\right)-\frac{1}{8}\cdot 2^{\frac{3}{4}}\log\left(2^{\frac{1}{4}}+\frac{\left(x^4-1\right)^{\frac{1}{4}}}{x}\right)+\frac{1}{8}\cdot 2^{\frac{3}{4}}\log\left(2^{\frac{1}{4}}-\frac{\left(x^4-1\right)^{\frac{1}{4}}}{x}\right)$$

43 Test file number 210

Test folder name:

`test_cases/210_Hebisch`

43.1 Problem number 42

$$\int e^{-17+e^{\frac{6x+e^{17}\left(-5+4x+x^2\right)}{e^{17}}}+\frac{6x+e^{17}\left(-5+4x+x^2\right)}{e^{17}}}\left(6+e^{17}(4+2x)\right)\,dx$$

Optimal antiderivative

$$5+\mathrm{e}^{\mathrm{e}^{\left(4+x+6\,\mathrm{e}^{-17}\right)x-5}}$$

command

```
integrate(((2*x+4)*exp(17)+6)*exp(((x^2+4*x-5)*exp(17)+6*x)/exp(17))*exp(exp(((x^2+4*x-
5)*exp(17)+6*x)/exp(17)))/exp(17),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(e^{\left(\left(x^2e^{17}+4\,xe^{17}+6\,x-5\,e^{17}\right)e^{(-17)}\right)}\right)}$$

43.2 Problem number 214

$$\int \frac{e^{\frac{2}{3}\left(5e^{9+6x+x^2}-3x-3x^2\log\left(e^2+2x\right)\right)}\left(-6e^2-12x-12x^2+e^{9+6x+x^2}\left(120x+40x^2+e^2(60+20x)\right)+\left(-12e^2x-24x^2\right.\right.}{3e^2+6x}$$

Optimal antiderivative

$$\mathrm{e}^{\frac{10\,\mathrm{e}^{(3+x)^2}}{3}-2x-2x^2\ln\left(\mathrm{e}^2+2x\right)}$$

command

```
integrate(((-12*exp(2)*x-24*x^2)*log(exp(2)+2*x)+((20*x+60)*exp(2)+40*x^2+120*x)*exp(x^2+6*x+
6*exp(2)-12*x^2-12*x)*exp(-x^2*log(exp(2)+2*x)+5/3*exp(x^2+6*x+9)-x)^2/(3*exp(2)+6*x),x, algo
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-2\,x^2\log\left(2\,x+e^2\right)-2\,x+\frac{10}{3}\,e^{\left(x^2+6\,x+9\right)}\right)}$$

43.3 Problem number 529

$$\int \frac{e^{3-x-\frac{e^{3-x}\left(1+5e^{-3+x}x\right)}{x}}\left(-1-x-e^{-3+x}x+6e^{-3+x+\frac{e^{3-x}\left(1+5e^{-3+x}x\right)}{x}}x\right)}{5x}\,dx$$

Optimal antiderivative

$$\frac{6x}{5}-1-\frac{x\,\mathrm{e}^{-5-\frac{\mathrm{e}^{3-x}}{x}}}{5}-\mathrm{e}^{3}$$

command

```
integrate(1/5*(6*x*exp(-3+x)*exp((5*x*exp(-3+x)+1)/x/exp(-3+x))-x*exp(-3+x)-x-1)/x/exp(-
3+x)/exp((5*x*exp(-3+x)+1)/x/exp(-3+x)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{5}xe^{\left(-\frac{5\,x+e^{(-x+3)}}{x}\right)}+\frac{6}{5}x$$

43.4 Problem number 756

$$\int \frac{e^{1+8x+x^2+x\log\left(\frac{7-3e^4+6x}{3x}\right)}\left(-49-62x-12x^2+e^4(21+6x)+\left(-7+3e^4-6x\right)\log\left(\frac{7-3e^4+6x}{3x}\right)\right)}{-7+3e^4-6x}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{x\left(8+\ln\left(\frac{\frac{7}{3}-\mathrm{e}^4}{x}+2\right)+x\right)+1}$$

command

```
integrate(((3*exp(4)-6*x-7)*log(1/3*(-3*exp(4)+6*x+7)/x)+(6*x+21)*exp(4)-12*x^2-62*x-
49)*exp(x*log(1/3*(-3*exp(4)+6*x+7)/x)+x^2+8*x+1)/(3*exp(4)-6*x-7),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(x^2+x\log\left(-\frac{e^4}{x}+\frac{7}{3\,x}+2\right)+8\,x+1\right)}$$

43.5 Problem number 819

$$\int \frac{10x - 3e^{2x}x - 6e^x x^3 - 3x^5 + \left(e^{3x}(6+12x) + e^{2x}\left(36x^2+12x^3\right) + e^x\left(-20+30x^4\right)\right)\log\left(10x - 3e^{2x}x - 6e^x x^3 - \right.}{-10x + 3e^{2x}x + 6e^x x^3 + 3x^5}$$

Optimal antiderivative

$$\mathrm{e}^x \ln\left(x - 3x\left(\left(\mathrm{e}^x + x^2\right)^2 - 3\right)\right)^2 - x$$

command

```
integrate(((3*x*exp(x)^3+6*exp(x)^2*x^3+(3*x^5-10*x)*exp(x))*log(-3*x*exp(x)^2-6*exp(x)*x^3-
3*x^5+10*x)^2+((12*x+6)*exp(x)^3+(12*x^3+36*x^2)*exp(x)^2+(30*x^4-20)*exp(x))*log(-
3*x*exp(x)^2-6*exp(x)*x^3-3*x^5+10*x)-3*x*exp(x)^2-6*exp(x)*x^3-3*x^5+10*x)/(3*x*exp(x)^2+6*e
10*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$e^x \log\left(-3\,x^5 - 6\,x^3 e^x - 3\,x e^{(2\,x)} + 10\,x\right)^2 - x$$

43.6 Problem number 856

$$\int \frac{e^{\frac{-x^2+x\log\left(x^2\right)+\log\left(\frac{16-\log(3+x)}{e}\right)}{x}}\left(95x - 16x^2 - 16x^3 + \left(-6x+x^2+x^3\right)\log(3+x) + (-48 - 16x + (3+x)\log(3+x\right.}{-48x^2 - 16x^3 + \left(3x^2+x^3\right)\log(3+x)}$$

Optimal antiderivative

$$-\mathrm{e}^{\ln\left(x^2\right)+\frac{\ln\left((-\ln(3+x)+16)\mathrm{e}^{-1}\right)}{x}} - x$$

command

```
integrate((((3+x)*log(3+x)-16*x-48)*log((-log(3+x)+16)/exp(1))+(x^3+x^2-6*x)*log(3+x)-
16*x^3-16*x^2+95*x)*exp((log((-log(3+x)+16)/exp(1))+x*log(x^2)-x^2)/x)/((x^3+3*x^2)*log(3+x)-
16*x^3-48*x^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-e^{\left(-x+\frac{\log\left(-e^{(-1)}\log(x+3)+16\,e^{(-1)}\right)}{x}+\log\left(x^2\right)\right)}$$

43.7 Problem number 1147

$$\int \frac{\left(-x+2x\log(x)+(1+e^x+2x)\log^2(x)\right)\sqrt{\dfrac{x^4+(2x^2+2e^xx^2+2x^3+2x^4)\log(x)+(1+e^{2x}+2x+3x^2+2x^3}{\log^2(x)}}}{x^2\log(x)+(1+e^x+x+x^2)\log^2(x)}$$

Optimal antiderivative

$$\sqrt{\left(-1-x-\frac{x^2}{\ln(x)}-x^2-\mathrm{e}^x\right)^2}$$

command

```
integrate(((exp(x)+2*x+1)*log(x)^2+2*x*log(x)-x)*(((exp(x)^2+(2*x^2+2*x+2)*exp(x)+x^4+2*x^3+3
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{1}{3}\log(x)^3+\frac{3}{2}x^2-\frac{1}{2}\log(x)^2+2x+\frac{x^2}{\log(x)}+e^x$$

43.8 Problem number 1197

$$\int \frac{e^{\frac{-2x+3x^2+2x^3+8e^8\log\left(x^2\right)}{2+x}}\left(-8x+24x^2+30x^3+8x^4+e^8(64+32x)-16e^8x\log\left(x^2\right)\right)}{4x+4x^2+x^3}\,dx$$

Optimal antiderivative

$$2\,\mathrm{e}^{\frac{8\,\mathrm{e}^8\ln\left(x^2\right)}{2+x}-x+2x^2}$$

command

```
integrate((-16*x*exp(8)*log(x^2)+(32*x+64)*exp(8)+8*x^4+30*x^3+24*x^2-8*x)*exp((8*exp(8)*log(
2*x)/(2+x))/(x^3+4*x^2+4*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$2\,e^{\left(\frac{2x^3}{x+2}+\frac{3x^2}{x+2}+\frac{8e^8\log\left(x^2\right)}{x+2}-\frac{2x}{x+2}\right)}$$

43.9 Problem number 1569

$$\int \frac{e^{\frac{e^{9+2x}\left(10+2x^2\right)+e^{9+x}\left(100x+20x^3\right)+e^9\left(250x^2+50x^4\right)}{x^2}}\left(100e^9x^4+e^{9+2x}\left(-20+20x+4x^3\right)+e^{9+x}\left(-100x+100x^2+20x^3+\right.\right.}{x^3}$$

Optimal antiderivative

$$\mathrm{e}^{\frac{10\left(x^2+5\right)\mathrm{e}^9\left(x+\frac{\mathrm{e}^x}{5}\right)(5x+\mathrm{e}^x)}{x^2}}$$

command

```
integrate(((4*x^3+20*x-20)*exp(9)*exp(x)^2+(20*x^4+20*x^3+100*x^2-100*x)*exp(9)*exp(x)+100*x^
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(50\,x^2e^9+20\,xe^{(x+9)}+\frac{100\,e^{(x+9)}}{x}+\frac{10\,e^{(2\,x+9)}}{x^2}+250\,e^9+2\,e^{(2\,x+9)}\right)}$$

43.10 Problem number 1596

$$\int \frac{e^{\frac{2}{5}\left(5e^{\frac{-2e^2+x\log^2\left(\frac{2+3x}{x}\right)}{x^2}}-x\right)}\left(-4x^3-6x^4+e^{\frac{-2e^2+x\log^2\left(\frac{2+3x}{x}\right)}{x^2}}\left(e^2(80+120x)-40x\log\left(\frac{2+3x}{x}\right)+\left(-20x-30x^2\right)\log\right.\right.}{10x^3+15x^4}$$

Optimal antiderivative

$$\mathrm{e}^{2\,\mathrm{e}^{\frac{\ln\left(4-\frac{-2+x}{x}\right)^2-\frac{2\,\mathrm{e}^2}{x}}{x}}-\frac{2x}{5}}$$

command

```
integrate((((-30*x^2-20*x)*log((2+3*x)/x)^2-40*x*log((2+3*x)/x)+(120*x+80)*exp(2))*exp((x*log
2*exp(2))/x^2)-6*x^4-4*x^3)*exp(exp((x*log((2+3*x)/x)^2-2*exp(2))/x^2)-1/5*x)^2/(15*x^4+10*x^
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-\frac{2}{5}\,x+2\,e^{\left(\frac{\log\left(\frac{2}{x}+3\right)^2}{x}-\frac{2\,e^2}{x^2}\right)}\right)}$$

43.11 Problem number 1763

$$\int \frac{\left(-2x^2-8e^x x^2\right)\log^2(x)+\left(\left(-2x^2+8e^x x^3\right)\log(x)+\left(-2x^2+8e^x x^3\right)\log^2(x)\right)\log\left(e^{-x}(-2+8e^x x)\right)+\left((2x+8e\right.}{}$$

Optimal antiderivative

$$\left(x-\ln\left(\ln\left(8x-2\,\mathrm{e}^{-x}\right)\right)\right)^2\ln(x)^2$$

command

```
integrate(((8*exp(x)*x-2)*log(x)*log((8*exp(x)*x-2)/exp(x))*log(log((8*exp(x)*x-2)/exp(x)))^2
8*exp(x)*x^2+2*x)*log(x)^2+(-16*exp(x)*x^2+4*x)*log(x))*log((8*exp(x)*x-2)/exp(x))+(8*exp(x)*
2)/exp(x)))+((8*exp(x)*x^3-2*x^2)*log(x)^2+(8*exp(x)*x^3-2*x^2)*log(x))*log((8*exp(x)*x-
2)/exp(x))+(-8*exp(x)*x^2-2*x^2)*log(x)^2)/(4*exp(x)*x^2-x)/log((8*exp(x)*x-2)/exp(x)),x, alg
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned}&x^2\log(x)^2-2\,x\log(x)^2\log\left(-x+\log(2)+\log\left(4\,xe^x-1\right)\right)\\&+\log(x)^2\log\left(-x+\log(2)+\log\left(4\,xe^x-1\right)\right)^2\end{aligned}$$

43.12 Problem number 1809

$$\int \frac{e^{-e^{-5+e^5-x}}\left(20x-4x^2-x^3\right)\left(-20+8x+3x^2+e^{-5+e^5-x}\left(-20x+4x^2+x^3\right)\right)}{-20x+4x^2+x^3}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\ln\left(\left(-x^2-4x+20\right)x\right)-\mathrm{e}^{\mathrm{e}^5-x-5}}$$

command

```
integrate(((x^3+4*x^2-20*x)*exp(exp(5)-x-5)+3*x^2+8*x-20)*exp(log(-x^3-4*x^2+20*x)-
exp(exp(5)-x-5))/(x^3+4*x^2-20*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\left(x^3e^{\left(-x+e^5-e^{\left(-x+e^5-5\right)}-5\right)}+4\,x^2e^{\left(-x+e^5-e^{\left(-x+e^5-5\right)}-5\right)}-20\,xe^{\left(-x+e^5-e^{\left(-x+e^5-5\right)}-5\right)}\right)e^{(x-e^5+5)}$$

43.13 Problem number 1860

$$\int \frac{e^{\frac{e^9-x\log\left(\frac{e^{e^2}\log^2(-4+x)}{x^2}\right)}{\log\left(\frac{e^{e^2}\log^2(-4+x)}{x^2}\right)}}\left(-2e^9x+e^9(-8+2x)\log(-4+x)+\left(4x-x^2\right)\log(-4+x)\log^2\left(\frac{e^{e^2}\log^2(-4+x)}{x^2}\right)\right)}{\left(-4x+x^2\right)\log(-4+x)\log^2\left(\frac{e^{e^2}\log^2(-4+x)}{x^2}\right)}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\frac{\mathrm{e}^9}{\ln\left(\frac{\mathrm{e}^{\mathrm{e}^2}\ln(-4+x)^2}{x^2}\right)}-x}$$

command

```
integrate(((-x^2+4*x)*log(x-4)*log(exp(exp(2))*log(x-4)^2/x^2)^2+(2*x-8)*exp(9)*log(x-
4)-2*x*exp(9))*exp((-x*log(exp(exp(2))*log(x-4)^2/x^2)+exp(9))/log(exp(exp(2))*log(x-
4)^2/x^2))/(x^2-4*x)/log(x-4)/log(exp(exp(2))*log(x-4)^2/x^2)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-x+\frac{e^9}{\log\left(\frac{e^{\left(e^2\right)}\log(x-4)^2}{x^2}\right)}\right)}$$

43.14 Problem number 1905

$$\int -\frac{e^{25+\frac{1}{5}\left(-1+\log^{-\frac{e^{25}x}{5+2x}}(5)\right)}\log^{-\frac{e^{25}x}{5+2x}}(5)\log(\log(5))}{25+20x+4x^2}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\mathrm{e}^{\frac{\ln(\ln(5))x\,\mathrm{e}^{25}}{-2x-5}}-\frac{1}{5}}$$

command

```
integrate(-exp(25)*log(log(5))*exp(-x*exp(25)*log(log(5))/(5+2*x))*exp(1/5*exp(-x*exp(25)*log
1/5)/(4*x^2+20*x+25),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\frac{1}{5}\,\log(5)^{-\frac{xe^{25}}{2\,x+5}-\frac{1}{5}}\right)}$$

43.15 Problem number 1996

$$\int \frac{-1500e^{15-3x}x^5+e^{20-4x}\left(-2500x^5+2500x^6\right)+e^x\left(e^{20-4x}\left(2500x^3-2500x^4\right)+e^{15-3x}\left(-1500x^3+1500x^4\right)\right)+}{}$$

Optimal antiderivative

$$\left(x\ln\left(\frac{x}{2}-\frac{\mathrm{e}^x}{2x}\right)+\frac{5x\,\mathrm{e}^{5-x}}{3}\right)^4$$

command

```
integrate(((324*exp(x)*x^3-324*x^5)*log(1/2*(-exp(x)+x^2)/x)^4+(((-540*x^4+2160*x^3)*exp(5-
x)+324*x^4-324*x^3)*exp(x)+(540*x^6-2160*x^5)*exp(5-x)-324*x^5)*log(1/2*(-exp(x)+x^2)/x)^3+((
2700*x^4+5400*x^3)*exp(5-x)^2+(1620*x^4-1620*x^3)*exp(5-x))*exp(x)+(2700*x^6-5400*x^5)*exp(5-
x)^2-1620*x^5*exp(5-x))*log(1/2*(-exp(x)+x^2)/x)^2+(((-4500*x^4+6000*x^3)*exp(5-x)^3+(2700*x^
2700*x^3)*exp(5-x)^2)*exp(x)+(4500*x^6-6000*x^5)*exp(5-x)^3-2700*x^5*exp(5-x)^2)*log(1/2*(-
exp(x)+x^2)/x)+((-2500*x^4+2500*x^3)*exp(5-x)^4+(1500*x^4-1500*x^3)*exp(5-x)^3)*exp(x)+(2500*
2500*x^5)*exp(5-x)^4-1500*x^5*exp(5-x)^3)/(81*exp(x)-81*x^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{81}\left(81\,x^4e^{(4\,x)}\log\left(2\right)^4-324\,x^4e^{(4\,x)}\log\left(2\right)^3\log\left(x^2-e^x\right)+486\,x^4e^{(4\,x)}\log\left(2\right)^2\log\left(x^2-e^x\right)^2-324\,x^4e^{(4\,x)}\log\left(2\right)\right.$$

43.16 Problem number 2050

$$\int \frac{e^2(2+e)}{-e^2+6e^{2x+ex}}\,dx$$

Optimal antiderivative

$$\frac{1}{3}+\ln\left(\frac{\mathrm{e}^2\mathrm{e}^{-x(\mathrm{e}+2)}}{2}-3\right)$$

command

```
integrate((exp(1)+2)*exp(2)/(6*exp(x*exp(1)+2*x)-exp(2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: NotImplementedError

Giac 1.7.0 via sagemath 9.3 output

$$-\left(x(e+2)e^{(-2)}-e^{(-2)}\log\left(\left|-e^2+6\,e^{(x(e+2))}\right|\right)\right)e^2$$

43.17 Problem number 2306

$$\int \frac{e^{16x^8}(-839808-209952x)+e^{16x^8}\left(10917504x^7+6718464x^8+839808x^9\right)\log\left(13+8x+x^2\right)+e^{12x^8}(279936+}{}$$

Optimal antiderivative

$$\left(\frac{9\,\mathrm{e}^{4x^8}}{\ln\left(\left(4+x\right)^2-3\right)^4}-1\right)^4$$

command

```
integrate(((-1152*x^9-9216*x^8-14976*x^7)*exp(x^8)^4*log(x^2+8*x+13)^13+(288*x+1152)*exp(x^8)
7776*x-31104)*exp(x^8)^8*log(x^2+8*x+13)^8+(-279936*x^9-2239488*x^8-3639168*x^7)*exp(x^8)^12*
209952*x-839808)*exp(x^8)^16)/(x^2+8*x+13)/log(x^2+8*x+13)^17,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{9\left(4\,e^{(4\,x^8)}\log\left(x^2+8\,x+13\right)^{12}-54\,e^{(8\,x^8)}\log\left(x^2+8\,x+13\right)^8+324\,e^{(12\,x^8)}\log\left(x^2+8\,x+13\right)^4-729\,e^{(16\,x^8)}\right)}{\log\left(x^2+8\,x+13\right)^{16}}$$

43.18 Problem number 2370

$$\int \frac{\frac{1}{27}e^{3x}x^2+\frac{1}{3}e^{2x}x^3+e^x x^4+x^5+e^{x+\frac{100}{\frac{e^{2x}}{9}+\frac{2e^x x}{3}+x^2}}\left(\frac{1}{27}e^{3x}(1-x)+200x+x^3-x^4+\frac{1}{9}e^{2x}\left(3x-3x^2\right)+\frac{1}{3}e^x\left(200x\right.\right.}{\frac{1}{27}e^{3x}x^2+\frac{1}{3}e^{2x}x^3+e^x x^4+x^5}$$

Optimal antiderivative

$$x-\frac{\mathrm{e}^x \mathrm{e}^{\frac{25}{\left(\frac{\mathrm{e}^{-\ln(3)+x}}{2}+\frac{x}{2}\right)^2}}}{x}$$

command

```
integrate((((1-x)*exp(-log(3)+x)^3+(-3*x^2+3*x)*exp(-log(3)+x)^2+(-3*x^3+3*x^2+200*x)*exp(-
log(3)+x)-x^4+x^3+200*x)*exp(x)*exp(100/(exp(-log(3)+x)^2+2*x*exp(-log(3)+x)+x^2))+x^2*exp(-
log(3)+x)^3+3*x^3*exp(-log(3)+x)^2+3*x^4*exp(-log(3)+x)+x^5)/(x^2*exp(-log(3)+x)^3+3*x^3*exp(
log(3)+x)^2+3*x^4*exp(-log(3)+x)+x^5),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{x^2-e^{\left(\frac{9\,x^3+6\,x^2e^x+xe^{(2\,x)}+900}{9\,x^2+6\,xe^x+e^{(2\,x)}}\right)}}{x}$$

43.19 Problem number 2446

$$\int \frac{e^{\frac{1}{3}\left(-e^{-4+\sqrt[4]{x}}-3x\log(3)\right)}\left(-e^{-4+\sqrt[4]{x}}\sqrt[4]{x}-12x\log(3)\right)}{48x}\,dx$$

Optimal antiderivative

$$\frac{\mathrm{e}^{-\frac{\mathrm{e}^{x^{\frac{1}{4}}-4}}{3}-x\ln(3)}}{4}$$

command

```
integrate(1/48*(-x^(1/4)*exp(x^(1/4)-4)-12*x*log(3))*exp(-1/3*exp(x^(1/4)-4)-x*log(3))/x,x, a
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{1}{4}\,e\left(-\left(x^{\frac{1}{4}}-4\right)^4\log(3)-16\left(x^{\frac{1}{4}}-4\right)^3\log(3)-96\left(x^{\frac{1}{4}}-4\right)^2\log(3)-256\left(x^{\frac{1}{4}}-4\right)\log(3)-\frac{1}{3}\,e^{\left(x^{\frac{1}{4}}-4\right)}-256\,\log(3)\right)$$

43.20 Problem number 2680

$$\int \frac{12x-12x^2-12x^3+24x^4-12x^5+\left(-12+12x+24x^2-48x^3+24x^4\right)\log(2)+\left(-12x+24x^2-12x^3\right)\log^2(2)}{\left(-4x^2+11x^3-10x^4+3x^5+(8x-22x^2\right.}$$

Optimal antiderivative

$$\frac{4x-\frac{4x}{(\ln(2)-x)(x^2-x)}}{\ln\left(2-\frac{3x}{2}\right)}$$

command

```
integrate((((12*x^3-40*x^2+44*x-16)*log(2)^2+(-24*x^4+80*x^3-88*x^2+44*x-16)*log(2)+12*x^5-
40*x^4+44*x^3-40*x^2+44*x-16)*log(2-3/2*x)+(-12*x^3+24*x^2-12*x)*log(2)^2+(24*x^4-
48*x^3+24*x^2+12*x-12)*log(2)-12*x^5+24*x^4-12*x^3-12*x^2+12*x)/((3*x^3-10*x^2+11*x-
4)*log(2)^2+(-6*x^4+20*x^3-22*x^2+8*x)*log(2)+3*x^5-10*x^4+11*x^3-4*x^2)/log(2-3/2*x)^2,x, al
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{4\left(x^3-x^2\log(2)-x^2+x\log(2)+1\right)}{x^2\log(2)-x\log(2)^2-x^2\log(-3x+4)+x\log(2)\log(-3x+4)-x\log(2)+\log(2)^2+x\log(-3x+4)-\log}$$

43.21 Problem number 2802

$$\int \frac{e^{\frac{9x}{\log\left(\frac{e^{10}+2e^5x+x^2}{e^8}\right)}}\left(36x+\left(-18e^5-18x\right)\log\left(\frac{e^{10}+2e^5x+x^2}{e^8}\right)\right)}{e^{\frac{18x}{\log\left(\frac{e^{10}+2e^5x+x^2}{e^8}\right)}}(e^5+x)\log^2\left(\frac{e^{10}+2e^5x+x^2}{e^8}\right)+e^{\frac{9x}{\log\left(\frac{e^{10}+2e^5x+x^2}{e^8}\right)}}(2e^7+2e^2x)\log^2\left(\frac{e^{10}+2e^5x+x^2}{e^8}\right)+(e^9+e^4x)\log}$$

Optimal antiderivative

$$\frac{2}{e^{\frac{9x}{\ln\left(\left(e^5+x\right)^2e^{-8}\right)}}+e^2}$$

command

```
integrate(((-18*exp(5)-18*x)*log((exp(5)^2+2*x*exp(5)+x^2)/exp(4)^2)+36*x)*exp(9*x/log((exp(5
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{}{x^2e^2\log\left(x^2+2xe^5+e^{10}\right)^3+x^2e^{\left(\frac{9x}{\log\left(x^2+2xe^5+e^{10}\right)-8}\right)}\log\left(x^2+2xe^5+e^{10}\right)^3-26x^2e^2\log\left(x^2+2xe^5+e^{10}\right)^2-26}$$

43.22 Problem number 2888

$$\int \frac{1}{3}\left(-5+e^{-9-x+e^5 x-e^x x}\left(-3+3e^5+e^x(-3-3x)\right)\right)\,dx$$

Optimal antiderivative

$$1-\frac{5x}{3}+\mathrm{e}^{x\left(\mathrm{e}^5-\mathrm{e}^x\right)-x-9}$$

command

```
integrate(1/3*((-3*x-3)*exp(x)+3*exp(5)-3)*exp(-exp(x)*x+x*exp(5)-x-9)-5/3,x, algorithm="giac
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{5}{3}\,x+e^{\left(xe^5-xe^x-x-9\right)}$$

43.23 Problem number 2912

$$\int \frac{e^{\frac{4-4x-3x^2+2x^3+x^4}{x-2e^{e^8}x x+e^{2e^8}x x}}\left(4+3x^2-4x^3-3x^4+e^{e^8 x}\left(-4-3x^2+4x^3+3x^4+e^8\left(-8x+8x^2+6x^3-4x^4-2x^5\right)\right)\right)}{-x^2+3e^{e^8 x}x^2-3e^{2e^8 x}x^2+e^{3e^8 x}x^2}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\frac{\left(x^2+x-2\right)^2}{x\left(1-\mathrm{e}^x\,\mathrm{e}^8\right)^2}}$$

command

```
integrate((((-2*x^5-4*x^4+6*x^3+8*x^2-8*x)*exp(4)^2+3*x^4+4*x^3-3*x^2-4)*exp(x*exp(4)^2)-
3*x^4-4*x^3+3*x^2+4)*exp((x^4+2*x^3-3*x^2-4*x+4)/(x*exp(x*exp(4)^2)^2-2*x*exp(x*exp(4)^2)+x))
3*x^2*exp(x*exp(4)^2)^2+3*x^2*exp(x*exp(4)^2)-x^2),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\frac{x^4}{xe^{\left(2\,xe^8\right)}-2\,xe^{\left(xe^8\right)}+x}+\frac{2\,x^3}{xe^{\left(2\,xe^8\right)}-2\,xe^{\left(xe^8\right)}+x}-\frac{3\,x^2}{xe^{\left(2\,xe^8\right)}-2\,xe^{\left(xe^8\right)}+x}-\frac{4\,x}{xe^{\left(2\,xe^8\right)}-2\,xe^{\left(xe^8\right)}+x}+\frac{4}{xe^{\left(2\,xe^8\right)}-2\,xe^{\left(xe^8\right)}+x}\right)}$$

43.24 Problem number 2955

$$\int \frac{e^{6561+5832x^2-2916x^3+1944x^4-1944x^5+774x^6-432x^7+232x^8+e^4x^8+e^5x^8-68x^9+24x^{10}-8x^{11}+x^{12}+e^2\left(162x^4+72x^6-36x^7+8x^8-8x^9+2x^{10}\right)+\left(-2916x^2-\right.}}{}$$

Optimal antiderivative

$$e^{\left(e^2+\left(\frac{9}{x^2}-\ln(x)+2-x\right)^2\right)^2+e^5}-1$$

command

```
integrate(((4*x^9+4*x^8+72*x^6)*log(x)^3+(12*x^10-12*x^9-24*x^8+108*x^7-540*x^6-1944*x^4)*log
36*x^10+48*x^8-648*x^7+1296*x^6-2916*x^5+8748*x^4+17496*x^2)*log(x)+(4*x^10-4*x^9-
8*x^8+36*x^7-180*x^6-648*x^4)*exp(2)+4*x^12-20*x^11+24*x^10-20*x^9-140*x^8+864*x^7-
1980*x^6+6804*x^5-9720*x^4+14580*x^3-37908*x^2-52488)*exp((x^8*log(x)^4+(4*x^9-8*x^8-
36*x^6)*log(x)^3+(2*x^8*exp(2)+6*x^10-24*x^9+24*x^8-108*x^7+216*x^6+486*x^4)*log(x)^2+((4*x^9
8*x^8-36*x^6)*exp(2)+4*x^11-24*x^10+48*x^9-140*x^8+432*x^7-432*x^6+972*x^5-1944*x^4-
2916*x^2)*log(x)+x^8*exp(5)+x^8*exp(2)^2+(2*x^10-8*x^9+8*x^8-36*x^7+72*x^6+162*x^4)*exp(2)+x^
8*x^11+24*x^10-68*x^9+232*x^8-432*x^7+774*x^6-1944*x^5+1944*x^4-2916*x^3+5832*x^2+6561)/x^8)/
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(x^4+4x^3\log(x)+6x^2\log(x)^2+4x\log(x)^3+\log(x)^4-8x^3+2x^2e^2-24x^2\log(x)+4xe^2\log(x)-24x\log(x)^2+2e^2\log(x)^2-8\log(x)^3+24x^2-8xe^2+\right.}$$

43.25 Problem number 3083

$$\int \frac{(80-20x)\log\left(\frac{1}{3}e^{-16+8x-x^2}\left(-1-15e^{16-8x+x^2}\right)\right)}{3+45e^{16-8x+x^2}}\,dx$$

Optimal antiderivative

$$\frac{5\ln\left(-\frac{e^{-(4-x)^2}}{3}-5\right)^2}{3}$$

command

```
integrate((-20*x+80)*log(1/3*(-15*exp(x^2-8*x+16)-1)/exp(x^2-8*x+16))/(45*exp(x^2-
8*x+16)+3),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{160}{3}x^2-\frac{1280}{3}x-\frac{160}{3}\log\left(15e^{(x^2-8x+16)}+1\right)$$

43.26 Problem number 3165

$$\int \frac{-1+6x-x^2+3\log(x)}{(12x^2-4x^3+4x\log(x))\log\left(\frac{2x^3}{3x-x^2+\log(x)}\right)+(3x^2-x^3+x\log(x))\log\left(\frac{2x^3}{3x-x^2+\log(x)}\right)\log\left(\log\left(\frac{2x^3}{3x-x^2+\log(x)}\right)\right)}$$

Optimal antiderivative

$$\ln\left(-12-3\ln\left(\ln\left(\frac{2x^2}{3+\frac{\ln(x)}{x}-x}\right)\right)\right)$$

command

```
integrate((3*log(x)-x^2+6*x-1)/((x*log(x)-x^3+3*x^2)*log(2*x^3/(log(x)-x^2+3*x))*log(log(2*x^
x^2+3*x)))+(4*x*log(x)-4*x^3+12*x^2)*log(2*x^3/(log(x)-x^2+3*x))),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\log\left(\log\left(i\,\pi+\log\left(2\right)-\log\left(x^2-3\,x-\log\left(x\right)\right)+3\,\log\left(x\right)\right)+4\right)$$

43.27 Problem number 3683

$$\int \frac{-4x-4e^x x^2-8x^3+\left(4+4e^x x+8x^2\right)\log(x)+\left(e^x(2-2x)+2x^2-2x^3+(2-2x)\log(x)\right)\log\left(e^x+x^2+\log(\right.}{\left(-e^x x^2-x^4+(e^x x-x^2+x^3)\log(x)+x\log^2(x)\right)\log\left(e^x+x^2+\log(x)\right)\log\left(\log\left(e^x+x^2\right.}$$

Optimal antiderivative

$$\ln\left(\left(\ln(x)-x\right)^2\ln\left(\ln\left(\ln(x)+x^2+\mathrm{e}^x\right)\right)^4\right)$$

command

```
integrate((((2-2*x)*log(x)+(2-2*x)*exp(x)-2*x^3+2*x^2)*log(log(x)+x^2+exp(x))*log(log(log(x)+
4*exp(x)*x^2-8*x^3-4*x)/(x*log(x)^2+(exp(x)*x+x^3-x^2)*log(x)-exp(x)*x^2-x^4)/log(log(x)+x^2+
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$2\,\log\left(-x+\log\left(x\right)\right)+4\,\log\left(\log\left(\log\left(x^2+e^x+\log\left(x\right)\right)\right)\right)$$

43.28 Problem number 3722

$$\int \frac{e^{-\frac{50e^{3-x}}{x}}\left(e^{3-x}(7200+7200x)+e^{\frac{50e^{3-x}}{x}}\left(18x^2+18x^3\right)+e^{\frac{25e^{3-x}}{x}}\left(-72x^2+e^{3-x}\left(-1800-3600x-1800x^2\right)\right)\right)}{x^2}\,d$$

Optimal antiderivative

$$3\left(1-4\,\mathrm{e}^{-\frac{25\,\mathrm{e}^{3-x}}{x}}+x\right)\left(3-12\,\mathrm{e}^{-\frac{25\,\mathrm{e}^{3-x}}{x}}+3x\right)$$

command

```
integrate(((18*x^3+18*x^2)*exp(25*exp(3-x)/x)^2+((-1800*x^2-3600*x-1800)*exp(3-x)-
72*x^2)*exp(25*exp(3-x)/x)+(7200*x+7200)*exp(3-x))/x^2/exp(25*exp(3-x)/x)^2,x, algorithm="gia
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$9\left(x^2e^{(-x+3)}+2\,xe^{(-x+3)}-8\,xe^{\left(-\frac{x^2-3\,x+25\,e^{(-x+3)}}{x}\right)}+16\,e^{\left(-\frac{x^2-3\,x+50\,e^{(-x+3)}}{x}\right)}-8\,e^{\left(-\frac{x^2-3\,x+25\,e^{(-x+3)}}{x}\right)}\right)e^{(x-3)}$$

43.29 Problem number 3788

$$\int \frac{e^{\frac{-6+5e^{10}x-5x\log(25x)}{-10+5x}}\left(16-10e^{10}-5x+10\log(25x)\right)}{20-20x+5x^2}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\frac{x\left(\mathrm{e}^{10}-\ln(25x)-\frac{6}{5x}\right)}{-2+x}}$$

command

```
integrate((10*log(25*x)-10*exp(5)^2-5*x+16)*exp((-5*x*log(25*x)+5*x*exp(5)^2-6)/(5*x-
10))/(5*x^2-20*x+20),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\frac{xe^{10}}{x-2}-\frac{x\log(25\,x)}{x-2}-\frac{6}{5\,(x-2)}\right)}$$

43.30 Problem number 3922

$$\int \frac{\left(1+e^5-2x\right)\log^2\left(1+e^5-2x\right)+e^{\frac{x}{\log\left(1+e^5-2x\right)}}\left(-2x^2\log\left(\frac{3x}{2}\right)+\left(-x-e^5x+2x^2\right)\log\left(1+e^5-2x\right)\log\left(\frac{3x}{2}\right)\right)}{\left(x+e^5x-2x^2\right)\log^2\left(1+e^5-2x\right)\log\left(\frac{3x}{2}\right)}\,d$$

Optimal antiderivative

$$\ln\left(\ln\left(\frac{3x}{2}\right)\mathrm{e}^{-\mathrm{e}^{\frac{x}{\ln\left(\mathrm{e}^5+1-2x\right)}}}\right)$$

command

```
integrate((((-x*exp(5)+2*x^2-x)*log(3/2*x)*log(exp(5)+1-2*x)-2*x^2*log(3/2*x))*exp(x/log(exp(
2*x))+(exp(5)+1-2*x)*log(exp(5)+1-2*x)^2)/(x*exp(5)-2*x^2+x)/log(3/2*x)/log(exp(5)+1-
2*x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-e^{\left(\frac{x}{\log\left(-2\,x+e^5+1\right)}\right)}+\log\left(-\log\left(2\right)+\log\left(3\,x\right)\right)$$

43.31 Problem number 4171

$$\int \frac{e^{4x\log(5)\log\left(e^{3x}-x\right)}\left(-100x\log(5)+300e^{3x}x\log(5)+\left(100e^{3x}\log(5)-100x\log(5)\right)\log\left(e^{3x}-x\right)\right)}{e^{3x}-x}\,dx$$

Optimal antiderivative

$$25\,\mathrm{e}^{4x\ln(5)\ln\left(\mathrm{e}^{3x}-x\right)}$$

command

```
integrate(((100*log(5)*exp(x)^3-100*x*log(5))*log(exp(x)^3-x)+300*x*log(5)*exp(x)^3-
100*x*log(5))*exp(2*x*log(5)*log(exp(x)^3-x))^2/(exp(x)^3-x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$25\,e^{\left(4\,x\log(5)\log\left(-x+e^{\left(3\,x\right)}\right)\right)}$$

43.32 Problem number 4209

$$\int \frac{e^{\frac{2\left(-e^6+x+4e^3x-4x^2+\left(2+e^6-x-4e^3x+4x^2+\left(e^6x-x^2-4e^3x^2+4x^3\right)\log(4)\right)\log(x)\right)}{-1+(1+x\log(4))\log(x)}}\left(-4-2x-8e^3x+16x^2+\left(4x+16e^3x-32x^2+\right.\right.}{x+(-2x-2x^2\log}$$

Optimal antiderivative

$$\mathrm{e}^{2\left(\mathrm{e}^3-2x\right)^2-2x+\frac{4}{1-\frac{1}{\ln(x)}+2x\ln(2)}}$$

command

```
integrate(((4*(-8*x^3*exp(3)+16*x^4-2*x^3)*log(2)^2+2*(-16*x^2*exp(3)+32*x^3-4*x^2-
4*x)*log(2)-8*x*exp(3)+16*x^2-2*x)*log(x)^2+(2*(16*x^2*exp(3)-32*x^3+4*x^2)*log(2)+16*x*exp(3
32*x^2+4*x)*log(x)-8*x*exp(3)+16*x^2-2*x-4)*exp((2*(x*exp(3)^2-4*x^2*exp(3)+4*x^3-
x^2)*log(2)+exp(3)^2-4*x*exp(3)+4*x^2-x+2)*log(x)-exp(3)^2+4*x*exp(3)-4*x^2+x)/((2*x*log(2)+1
1))^2/((4*x^3*log(2)^2+4*x^2*log(2)+x)*log(x)^2+(-4*x^2*log(2)-2*x)*log(x)+x),x, algorithm="g
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\frac{16x^3\log(2)\log(x)}{2x\log(2)\log(x)+\log(x)-1}-\frac{16x^2e^3\log(2)\log(x)}{2x\log(2)\log(x)+\log(x)-1}-\frac{4x^2\log(2)\log(x)}{2x\log(2)\log(x)+\log(x)-1}+\frac{4xe^6\log(2)\log(x)}{2x\log(2)\log(x)+\log(x)-1}+\frac{8x^2\log(x)}{2x\log(2)\log(x)+\log(x)-1}-\frac{8xe^3\log(}{2x\log(2)\log(x)+}\right.}$$

43.33 Problem number 4323

$$\int e^{-7+e^{e+2x}-x}\left(e(1-x)+2e^{1+e+2x}x\right)\,dx$$

Optimal antiderivative

$$\mathrm{e}\,\mathrm{e}^{\mathrm{e}^{e+2x}-x-7}x$$

command

```
integrate((2*x*exp(1)*exp(exp(1)+2*x)+(1-x)*exp(1))/exp(-exp(exp(1)+2*x)+x+7),x, algorithm="g
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$xe^{\left(-x+e^{(2x+e)}-6\right)}$$

43.34 Problem number 4476

$$\int \frac{e^{-4+\frac{-2x+e^4\log\left(x+x^2\right)\log(\log(x))}{e^4\log\left(x+x^2\right)}}\left(\left(12x+24x^2\right)\log(x)+\left(-12x-12x^2\right)\log(x)\log\left(x+x^2\right)+e^4(6+6x)\log^2\left(x+x^2\right)\right.}{(x+x^2)\log(x)\log^2\left(x+x^2\right)}$$

Optimal antiderivative

$$6\,\mathrm{e}^{\ln(\ln(x))-\frac{2\,\mathrm{e}^{-4}x}{\ln\left(x^2+x\right)}}$$

command

```
integrate(((6+6*x)*exp(4)*log(x^2+x)^2+(-12*x^2-12*x)*log(x)*log(x^2+x)+(24*x^2+12*x)*log(x))
2*x)/exp(4)/log(x^2+x))/(x^2+x)/exp(4)/log(x)/log(x^2+x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$6\,e^{\left(-\frac{2\,xe^{(-4)}}{\log\left(x^2+x\right)}+\log(\log(x))\right)}$$

43.35 Problem number 5416

$$\int \frac{e^{-2x}\left(-e^{2x}x^2+e^{\frac{2e^{-2x}\left(-e^4+e^{2x}(-3+x)\right)}{x}}\left(24e^{2x}+e^4(8+16x)\right)\right)}{x^2}\,dx$$

Optimal antiderivative

$$4\,\mathrm{e}^{\frac{-6+2x-2\,\mathrm{e}^{4-2x}}{x}}+20-x$$

command

```
integrate(((24*exp(2*x)+(16*x+8)*exp(4))*exp(((-3+x)*exp(2*x)-exp(4))/x/exp(2*x))^2-
exp(2*x)*x^2)/exp(2*x)/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-x+4\,e^{\left(\frac{2\left(x-e^{(-2\,x+4)}-3\right)}{x}\right)}$$

43.36 Problem number 5600

$$\int \frac{e^{20x+x\log\left(\frac{1-x\log\left(\frac{e^{-x}\log(2)}{x}\right)}{x}\right)}\left(-19-x-x^2+20x\log\left(\frac{e^{-x}\log(2)}{x}\right)+\left(-1+x\log\left(\frac{e^{-x}\log(2)}{x}\right)\right)\log\left(\frac{1-x\log\left(\frac{e^{-x}\log(2)}{x}\right)}{x}\right)\right.}{-1+x\log\left(\frac{e^{-x}\log(2)}{x}\right)}$$

Optimal antiderivative

$$e^{x\left(20+\ln\left(\frac{1}{x}-\ln\left(\frac{\ln(2)e^{-x}}{x}\right)\right)\right)}$$

command

```
integrate(((x*log(log(2)/exp(x)/x)-1)*log((-x*log(log(2)/exp(x)/x)+1)/x)+20*x*log(log(2)/exp(
x^2-x-19)*exp(x*log((-x*log(log(2)/exp(x)/x)+1)/x)+20*x)/(x*log(log(2)/exp(x)/x)-1),x, algori
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(x\log\left(\frac{1}{x}-\log\left(\frac{e^{(-x)}\log(2)}{x}\right)\right)+20\,x\right)}$$

43.37 Problem number 5649

$$\int \frac{e^{\frac{-7x+e^{36+e^4+12x^2+x^4+e^2\left(-12-2x^2\right)}x}{16+\log(x)}}\left(-105+e^{36+e^4+12x^2+x^4+e^2\left(-12-2x^2\right)}\left(15+384x^2-64e^2x^2+64x^4\right)+\left(-7+e^{36+}\right.\right.}{256+32\log(x)+\log^2(x)}$$

Optimal antiderivative

$$e^{\frac{x\left(e^{\left(e^2-x^2-6\right)^2}-7\right)}{16+\ln(x)}}$$

command

```
integrate((((-4*x^2*exp(2)+4*x^4+24*x^2+1)*exp(exp(2)^2+(-2*x^2-12)*exp(2)+x^4+12*x^2+36)-
7)*log(x)+(-64*x^2*exp(2)+64*x^4+384*x^2+15)*exp(exp(2)^2+(-2*x^2-12)*exp(2)+x^4+12*x^2+36)-
105)*exp((x*exp(exp(2)^2+(-2*x^2-12)*exp(2)+x^4+12*x^2+36)-7*x)/(16+log(x)))/(log(x)^2+32*log
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\frac{x e^{\left(x^4-2\,x^2e^2+12\,x^2+e^4-12\,e^2+36\right)}}{\log(x)+16}-\frac{7\,x}{\log(x)+16}\right)}$$

43.38 Problem number 5811

$$\int \frac{15x - 50e^x x + 10e^{2x} x - 5x^2 + \left(15x - 10x^2\right)\log(x) + \left(-125 + 50e^x - 5e^{2x} + \left(-15x + 5x^2\right)\log(x)\right)\log\left(25 - 10\right.}{\left(-25x + 10e^x x - e^{2x} x + \left(-3x^2 + x^3\right)\log(x)\right)\log\left(25 - 10e^x + e^{2x} + \left(3x - x^2\right)\log(x)\right)\log\left(\log\left(25 - 10e\right.\right.}$$

Optimal antiderivative

$$\frac{5}{\ln\left(\frac{\ln\left(\ln\left((5-e^x)^2+(3-x)x\ln(x)\right)\right)}{x}\right)}$$

command

```
integrate((((5*x^2-15*x)*log(x)-5*exp(x)^2+50*exp(x)-125)*log((-x^2+3*x)*log(x)+exp(x)^2-
10*exp(x)+25)*log(log((-x^2+3*x)*log(x)+exp(x)^2-10*exp(x)+25))+(-10*x^2+15*x)*log(x)+10*x*ex
50*exp(x)*x-5*x^2+15*x)/((x^3-3*x^2)*log(x)-x*exp(x)^2+10*exp(x)*x-25*x)/log((-x^2+3*x)*log(x
10*exp(x)+25)/log(log((-x^2+3*x)*log(x)+exp(x)^2-10*exp(x)+25))/log(log(log((-x^2+3*x)*log(x)
10*exp(x)+25))/x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{5}{\log(x) - \log\left(\log\left(\log\left(-x^2\log(x) + 3\,x\log(x) + e^{(2\,x)} - 10\,e^x + 25\right)\right)\right)}$$

43.39 Problem number 5911

$$\int \frac{e^{3-x\log\left(\frac{1}{3}\left(e^5 x - 3\log(x)\right)\right)}\left(-12 + 4e^5 x + \left(4e^5 x - 12\log(x)\right)\log\left(\frac{1}{3}\left(e^5 x - 3\log(x)\right)\right)\right)}{-e^5 x + 3\log(x)}\,dx$$

Optimal antiderivative

$$4\,\mathrm{e}^{-x\ln\left(-\ln(x)+\frac{x\,\mathrm{e}^5}{3}\right)+3} - 16$$

command

```
integrate(((-12*log(x)+4*x*exp(5))*log(-log(x)+1/3*x*exp(5))+4*x*exp(5)-12)*exp(-x*log(-
log(x)+1/3*x*exp(5))+3)/(3*log(x)-x*exp(5)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$4\,e^{\left(-x\log\left(\frac{1}{3}\,xe^5 - \log(x)\right)+3\right)}$$

43.40 Problem number 5947

$$\int \frac{e^{2x}\left(e^4(48-96x)-168x+168x^2+e^{\frac{1}{3}(2-2x)}(-48+128x)\right)}{48e^8x^2+48e^{\frac{2}{3}(2-2x)}x^2-168e^4x^3+147x^4+e^{\frac{1}{3}(2-2x)}\left(-96e^4x^2+168x^3\right)}\,dx$$

Optimal antiderivative

$$\frac{\mathrm{e}^{2x}}{\left(\frac{7x}{4}+\mathrm{e}^{-\frac{2x}{3}+\frac{2}{3}}-\mathrm{e}^4\right)x}$$

command

```
integrate(((128*x-48)*exp(-2/3*x+2/3)+(-96*x+48)*exp(4)+168*x^2-168*x)*exp(x)^2/(48*x^2*exp(-
2/3*x+2/3)^2+(-96*x^2*exp(4)+168*x^3)*exp(-2/3*x+2/3)+48*x^2*exp(4)^2-168*x^3*exp(4)+147*x^4)
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$235298\,x^8e^{\left(\frac{2}{3}x\right)}+268912\,x^7e^{\frac{2}{3}}+352947\,x^7e^{\left(\frac{2}{3}x\right)}-806736\,x^7e^{\left(\frac{2}{3}x+4\right)}-768320\,x^6e^{\frac{14}{3}}+403368\,x^6e^{\frac{2}{3}}+1152480\,x^6$$

43.41 Problem number 6013

$$\int \frac{e^{-1+e^{\frac{1}{x}}-x}\left(-e^{\frac{1}{x}}-x^2\right)}{x^2}\,dx$$

Optimal antiderivative

$$\frac{\mathrm{e}^{\ln\left(x^2\right)+\mathrm{e}^{\frac{1}{x}}-x-1}}{x^2}$$

command

```
integrate((-exp(1/x)-x^2)*exp(log(x^2)+exp(1/x)-x-1)/x^4,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-x+e^{\frac{1}{x}}-1\right)}$$

43.42 Problem number 6096

$$\int \frac{e^{\frac{1}{2}\left(5e^{\frac{1}{x^2}}x-5x^2-5x^3\right)}\left(2x+10x^3+15x^4+e^{\frac{1}{x^2}}\left(10-5x^2\right)\right)}{2e^{5e^{\frac{1}{x^2}}x-5x^2-5x^3}x-4e^{\frac{1}{2}\left(5e^{\frac{1}{x^2}}x-5x^2-5x^3\right)}x^2+2x^3}\,dx$$

Optimal antiderivative

$$\frac{x}{\mathrm{e}^{\frac{5x\,\mathrm{e}^{\frac{1}{x^2}}}{2}-\frac{5x^3}{2}-\frac{5x^2}{2}}-x}$$

command

```
integrate(((-5*x^2+10)*exp(1/x^2)+15*x^4+10*x^3+2*x)*exp(5/2*x*exp(1/x^2)-5/2*x^3-
5/2*x^2)/(2*x*exp(5/2*x*exp(1/x^2)-5/2*x^3-5/2*x^2)^2-4*x^2*exp(5/2*x*exp(1/x^2)-5/2*x^3-
5/2*x^2)+2*x^3),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\frac{x}{x-e^{\left(-\frac{5}{2}x^3-\frac{5}{2}x^2+\frac{5}{2}xe^{\left(\frac{1}{x^2}\right)}\right)}}$$

43.43 Problem number 6201

$$\int \frac{e^{\frac{1}{12}e^{-5+2x}}\left(-2-\frac{1}{3}e^{-5+2x}x\log(x)\right)}{25x-10e^{\frac{1}{12}e^{-5+2x}}x\log(x)+e^{\frac{1}{6}e^{-5+2x}}x\log^2(x)}\,dx$$

Optimal antiderivative

$$\frac{2}{\ln(x)\,\mathrm{e}^{\mathrm{e}^{-\ln(12)+2x-5}}-5}$$

command

```
integrate((-4*x*exp(-log(12)+2*x-5)*log(x)-2)*exp(exp(-log(12)+2*x-5))/(x*log(x)^2*exp(exp(-
log(12)+2*x-5))^2-10*x*log(x)*exp(exp(-log(12)+2*x-5))+25*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{2\left(xe^{(2x)}\log(x)+6e^5\right)}{xe^{\left(2x+\frac{1}{12}e^{(2x-5)}\right)}\log(x)^2-5xe^{(2x)}\log(x)+6e^{\left(\frac{1}{12}e^{(2x-5)}+5\right)}\log(x)-30e^5}$$

43.44 Problem number 6696

$$\int \frac{\left(-e^5+x\right)^{\frac{20x}{-x^2+\log^4(7)}}\left(20x^3-20x\log^4(7)+\left(20e^5x^2-20x^3+\left(20e^5-20x\right)\log^4(7)\right)\log\left(-e^5+x\right)\right)}{e^5x^4-x^5+\left(-2e^5x^2+2x^3\right)\log^4(7)+\left(e^5-x\right)\log^8(7)}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\frac{20\ln\left(-\mathrm{e}^5+x\right)}{\frac{\ln(7)^4}{x}-x}}$$

command

```
integrate((((20*exp(5)-20*x)*log(7)^4+20*x^2*exp(5)-20*x^3)*log(-exp(5)+x)-20*x*log(7)^4+20*x
exp(5)+x)/(log(7)^4-x^2))^4/((exp(5)-x)*log(7)^8+(-2*x^2*exp(5)+2*x^3)*log(7)^4+x^4*exp(5)-
x^5),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(x-e^5\right)^{\frac{20\left(x-e^5\right)}{\log(7)^4-\left(x-e^5\right)^2-2\left(x-e^5\right)e^5-e^{10}}}\left(x-e^5\right)^{\frac{20\,e^5}{\log(7)^4-\left(x-e^5\right)^2-2\left(x-e^5\right)e^5-e^{10}}}$$

43.45 Problem number 6926

$$\int \frac{e^{-x+x^{\frac{e^3+4x}{x}}}\left(x^2+x^{\frac{e^3+4x}{x}}\left(-e^3-4x+e^3\log(x)\right)\right)}{x^2}\,dx$$

Optimal antiderivative

$$-\mathrm{e}^{\mathrm{e}^{\frac{\left(\mathrm{e}^3+4x\right)\ln(x)}{x}}-x}$$

command

```
integrate(((log(x)*exp(3)-exp(3)-4*x)*exp((exp(3)+4*x)*log(x)/x)+x^2)*exp(exp((exp(3)+4*x)*lo
x)/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-e^{\left(x^{\frac{e^3}{x}+4}-x\right)}$$

43.46 Problem number 7043

$$\int \frac{4ex + e\left(160x - 40x^2\right)\log(4) + e(-16 + 4x)\log(4 - x) + e^{\frac{e^{\frac{x}{e}}}{4}}\left(4e + e(80 - 20x)\log(4) + e^{\frac{x}{e}}\left(20x - 5x^2\right)\log(4) -}{e(-16 + 4x)}$$

Optimal antiderivative

$$(\ln(4 - x) - 10x\ln(2))\left(x + \mathrm{e}^{\frac{\mathrm{e}^{\mathrm{e}^{-1}x}}{4}}\right) + 25$$

command

```
integrate((((x-4)*exp(x/exp(1))*log(-x+4)+2*(-5*x^2+20*x)*log(2)*exp(x/exp(1))+2*(-
20*x+80)*exp(1)*log(2)+4*exp(1))*exp(1/4*exp(x/exp(1)))+(4*x-16)*exp(1)*log(-x+4)+2*(-
40*x^2+160*x)*exp(1)*log(2)+4*x*exp(1))/(4*x-16)/exp(1),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$-\left(10\,x^2 e\log\left(2\right) + 10\,xe^{\left(\frac{1}{4}\,e^{\left(xe^{\left(-1\right)}\right)}+1\right)}\log\left(2\right) - xe\log\left(-x+4\right) - e^{\left(\frac{1}{4}\,e^{\left(xe^{\left(-1\right)}\right)}+1\right)}\log\left(-x+4\right)\right)e^{\left(-1\right)}$$

43.47 Problem number 7194

$$\int \frac{16x^2 + e^x\left(8x + 8x^2\right) + \left(6x + e^{2x}x + 2x^3 + e^x\left(3 + 3x^2\right)\right)\log\left(3 + e^x x + x^2\right) + \left(64x + e^x(32 + 32x) + \left(24 + 8e^x\right.\right.}{\left(3 + e^x x + x^2\right)\log\left(3 + e^x x + x^2\right)}$$

Optimal antiderivative

$$\mathrm{e}^x + \left(4\ln(\ln(3 + (x + \mathrm{e}^x)\,x)\,(2\ln(3) - 1)) + x\right)^2$$

command

```
integrate((((8*exp(x)*x+8*x^2+24)*log(exp(x)*x+x^2+3)+(32*x+32)*exp(x)+64*x)*log((2*log(3)-
1)*log(exp(x)*x+x^2+3))+(x*exp(x)^2+(3*x^2+3)*exp(x)+2*x^3+6*x)*log(exp(x)*x+x^2+3)+(8*x^2+8*
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned} &x^2 + 8\,x\log\left(2\,\log\left(3\right) - 1\right) + 8\,x\log\left(\log\left(x^2 + xe^x + 3\right)\right) \\ &\quad + 32\,\log\left(2\,\log\left(3\right) - 1\right)\log\left(\log\left(x^2 + xe^x + 3\right)\right) + 16\,\log\left(\log\left(x^2 + xe^x + 3\right)\right)^2 + e^x \end{aligned}$$

43.48 Problem number 7444

$$\int e^{-4+e^{16}(1-x)+4x+x^2-x^3+e^8(-2x+2x^2)}\left(4-e^{16}+2x-3x^2+e^8(-2+4x)\right)\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\left(4-\left(x-\mathrm{e}^8\right)^2\right)(-1+x)}$$

command

```
integrate((-exp(8)^2+(4*x-2)*exp(8)-3*x^2+2*x+4)*exp((1-x)*exp(8)^2+(2*x^2-2*x)*exp(8)-
x^3+x^2+4*x-4),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-x^3+2\,x^2e^8+x^2-xe^{16}-2\,xe^8+4\,x+e^{16}-4\right)}$$

43.49 Problem number 7495

$$\int \frac{80e^{-2e^5+2x}+40e^{-e^5+x}\log(5)+5\log^2(5)+e^{\frac{5e^{-e^5+x}+2e^{-e^5+x}\log(\log(4))}{4e^{-e^5+x}+\log(5)}}\left(5e^{-e^5+x}\log(5)+2e^{-e^5+x}\log(5)\log(\log(4))\right.}{16e^{-2e^5+2x}+8e^{-e^5+x}\log(5)+\log^2(5)}$$

Optimal antiderivative

$$5x+\mathrm{e}^{\frac{5+\ln\left(4\ln(2)^2\right)}{\ln(5)\mathrm{e}^{\mathrm{e}^5-x+4}}}$$

command

```
integrate(((log(5)*exp(-exp(5)+x)*log(4*log(2)^2)+5*log(5)*exp(-exp(5)+x))*exp((exp(-
exp(5)+x)*log(4*log(2)^2)+5*exp(-exp(5)+x))/(4*exp(-exp(5)+x)+log(5)))+80*exp(-exp(5)+x)^2+40
exp(5)+x)+5*log(5)^2)/(16*exp(-exp(5)+x)^2+8*log(5)*exp(-exp(5)+x)+log(5)^2),x, algorithm="gi
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(5\,xe^x+5\,e^x\log\left(4\,e^{\left(x-e^5\right)}+\log\left(5\right)\right)-5\,e^x\log\left(-4\,e^{\left(x-e^5\right)}-\log\left(5\right)\right)+e^{\left(\frac{4\,xe^{\left(x-e^5\right)}+x\log(5)+2\,e^{\left(x-e^5\right)}\log(2)+2\,e^{\left(x-e^5\right)}}{4\,e^{\left(x-e^5\right)}+\log(5)}\right.}\right.$$

43.50 Problem number 7627

$$\int \frac{1}{5} e^{-6+\frac{4e^{2x}x+e^{3+x}\left(20x+4x^2\right)+e^6\left(25x+10x^2+x^3\right)}{5e^6}} \left(e^{2x}(8+16x) + e^6\left(50+40x+6x^2\right)+e^{3+x}\left(40+56x+8x^2\right)\right)\, dx$$

Optimal antiderivative

$$2\,\mathrm{e}^{\frac{x\left(5+2\,\mathrm{e}^{x}\mathrm{e}^{-3}+x\right)^2}{5}}$$

command

```
integrate(1/5*((16*x+8)*exp(x)^2+(8*x^2+56*x+40)*exp(3)*exp(x)+(6*x^2+40*x+50)*exp(3)^2)*exp(
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$2\,e^{\left(\frac{1}{5}x^3+\frac{4}{5}x^2e^{(x-3)}+2x^2+\frac{4}{5}xe^{(2x-6)}+4xe^{(x-3)}+5x\right)}$$

43.51 Problem number 7683

$$\int \frac{e^{-x}\left(-1+(1-x)\log\left(-\frac{x}{2}\right)-\log^2\left(-\frac{x}{2}\right)\right)}{\log^2\left(-\frac{x}{2}\right)}\, dx$$

Optimal antiderivative

$$\frac{\left(x+\frac{x^2}{\ln\left(-\frac{x}{2}\right)}\right)\mathrm{e}^{-x}}{x}$$

command

```
integrate((-log(-1/2*x)^2+(1-x)*log(-1/2*x)-1)/exp(x)/log(-1/2*x)^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\frac{xe^{(-x)}+e^{(-x)}\log\left(-\frac{1}{2}x\right)}{\log\left(-\frac{1}{2}x\right)}$$

43.52 Problem number 7755

$$\int \frac{-6x+2x^3+e^{10}\left(-6x+2x^3\right)+e^5\left(-12x+4x^3\right)+e^{2-2x}\left(-6x+6x^2+2x^3-2x^4\right)+e^{1-x}\left(-12x+6x^2+4x^3-\right.}{1}$$

Optimal antiderivative

$$\ln\left(1+x^2\left(\mathrm{e}^{1-x}+\mathrm{e}^5+1\right)^2\right)\left(x^2-3\right)$$

command

```
integrate(((2*x^3*exp(1-x)^2+(4*x^3*exp(5)+4*x^3)*exp(1-x)+2*x^3*exp(5)^2+4*x^3*exp(5)+2*x^3+
x)^2+(2*x^2*exp(5)+2*x^2)*exp(1-x)+x^2*exp(5)^2+2*x^2*exp(5)+x^2+1)+(-2*x^4+2*x^3+6*x^2-
6*x)*exp(1-x)^2+((-2*x^4+4*x^3+6*x^2-12*x)*exp(5)-2*x^4+4*x^3+6*x^2-12*x)*exp(1-x)+(2*x^3-
6*x)*exp(5)^2+(4*x^3-12*x)*exp(5)+2*x^3-6*x)/(x^2*exp(1-x)^2+(2*x^2*exp(5)+2*x^2)*exp(1-
x)+x^2*exp(5)^2+2*x^2*exp(5)+x^2+1),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned}&-2\,x^3+x^2\log\left(x^2e^2+x^2e^{(2\,x)}+x^2e^{(2\,x+10)}+2\,x^2e^{(2\,x+5)}+2\,x^2e^{(x+6)}+2\,x^2e^{(x+1)}+e^{(2\,x)}\right)\\&+6\,x-3\,\log\left(x^2e^2+x^2e^{(2\,x)}+x^2e^{(2\,x+10)}+2\,x^2e^{(2\,x+5)}+2\,x^2e^{(x+6)}+2\,x^2e^{(x+1)}+e^{(2\,x)}\right)\end{aligned}$$

43.53 Problem number 7789

$$\begin{aligned}&\int x^{35+609x+2650x^2+625x^3+e^2(4+x)}\left(72+1218x+5300x^2+1250x^3\right.\\&\left.+e^2(8+2x)+\left(1218x+2e^2x+10600x^2+3750x^3\right)\log(x)\right)\,dx\end{aligned}$$

Optimal antiderivative

$$2\,\mathrm{e}^{\left((3+25x)^2+\mathrm{e}^2\right)(4+x)\ln(x)}$$

command

```
integrate(((2*exp(2)*x+3750*x^3+10600*x^2+1218*x)*log(x)+(2*x+8)*exp(2)+1250*x^3+5300*x^2+121
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$2\,e^{\left(625\,x^3\log(x)+2650\,x^2\log(x)+xe^2\log(x)+609\,x\log(x)+4\,e^2\log(x)+36\,\log(x)\right)}$$

43.54 Problem number 8043

$$\int \frac{e^{-2e^{2-x^2}\log(3)+2x\log(3)}x-2x\log(3)-4e^{2-x^2}x^2\log(3)+\left(1+e^{-2e^{2-x^2}\log(3)+2x\log(3)}x\right)\log\left(e^{2e^{2-x^2}\log(3)-2x}\right.}{\left(x+e^{-2e^{2-x^2}\log(3)+2x\log(3)}x^2\right)\log\left(e^{2e^{2-x^2}\log(3)-2x\log(3)}\left(-1-e^{-2e^{2-x^2}\log(3)+2x\log(3)}x\right)\right)\log\left(x\log\left(e^{2e^{2-x^2}\log(}\right.\right.$$

Optimal antiderivative

$$\ln\left(\ln\left(x\ln\left(-\mathrm{e}^{-2\ln(3)\left(x-\mathrm{e}^{-x^2+2}\right)}-x\right)\right)\right)$$

command

```
integrate(((x*exp(-log(3)*exp(-x^2+2)+x*log(3))^2+1)*log((-x*exp(-log(3)*exp(-x^2+2)+x*log(3)
1)/exp(-log(3)*exp(-x^2+2)+x*log(3))^2)+x*exp(-log(3)*exp(-x^2+2)+x*log(3))^2-4*x^2*log(3)*ex
x^2+2)-2*x*log(3))/(x^2*exp(-log(3)*exp(-x^2+2)+x*log(3))^2+x)/log((-x*exp(-log(3)*exp(-
x^2+2)+x*log(3))^2-1)/exp(-log(3)*exp(-x^2+2)+x*log(3))^2)/log(x*log((-x*exp(-log(3)*exp(-
x^2+2)+x*log(3))^2-1)/exp(-log(3)*exp(-x^2+2)+x*log(3))^2)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\log\left(\log\left(x\log\left(-\left(xe^{\left(2x\log(3)-2e^{\left(-x^2+2\right)}\log(3)\right)}+1\right)e^{\left(-2x\log(3)+2e^{\left(-x^2+2\right)}\log(3)\right)}\right)\right)\right)$$

43.55 Problem number 8143

$$\int \frac{-192x^6-96x^7+e^5\left(-192x^3-240x^4-72x^5-48x^6-24x^7\right)+\left(-96x^6+e^5\left(-192x^3-120x^4-24x^6\right)\right)\log(3)+}{256}$$

Optimal antiderivative

$$\frac{\left(\mathrm{e}^{\frac{x}{4}}-3\right)(\ln(3)+2+x)^2}{\left(4+\mathrm{e}^5+\frac{\mathrm{e}^5}{x^2}\right)^2}$$

command

```
integrate(((((x^6+x^4+16*x^3)*exp(5)+4*x^6)*log(3)^2+((2*x^7+12*x^6+2*x^5+44*x^4+64*x^3)*exp(
48*x^3*exp(5)*log(3)^2+((-24*x^6-120*x^4-192*x^3)*exp(5)-96*x^6)*log(3)+(-24*x^7-48*x^6-
72*x^5-240*x^4-192*x^3)*exp(5)-96*x^7-192*x^6)/((4*x^6+12*x^4+12*x^2+4)*exp(5)^3+(48*x^6+96*x
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

output too large to display

43.56 Problem number 8742

$$\int \frac{e^{\frac{3x+e^{200+40x+2x^2}x-\log\left(-2+e^2+e^5\right)}{x}}\left(e^{200+40x+2x^2}\left(40x^2+4x^3\right)+\log\left(-2+e^2+e^5\right)\right)}{x^2}\,dx$$

Optimal antiderivative

$$1+\mathrm{e}^{\mathrm{e}^{2(x+10)^2}-\frac{\ln\left(e^5+\mathrm{e}^2-2\right)}{x}+3}$$

command

```
integrate((log(exp(5)+exp(2)-2)+(4*x^3+40*x^2)*exp(x^2+20*x+100)^2)*exp((-log(exp(5)+exp(2)-
2)+x*exp(x^2+20*x+100)^2+3*x)/x)/x^2,x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-\frac{\log\left(e^5+e^2-2\right)}{x}+e^{\left(2\,x^2+40\,x+200\right)}+3\right)}$$

43.57 Problem number 9011

$$\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}\left(-x^2-x^3\right)+\left(3+e^{10}\left(x^2+2x^3\right)\right)\log(x)+\left(-6-e^{10}x^3\right)\log(x)\log\left(\frac{x}{5\log(x)}\right)\right)}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)}\,d$$

Optimal antiderivative

$$\mathrm{e}^{\frac{\frac{3\,\mathrm{e}^{-10}}{x^2}-x-1}{\ln\left(\frac{x}{5\ln(x)}\right)-1}}$$

command

```
integrate(((-x^3*exp(5)^2-6)*log(x)*log(1/5*x/log(x))+((2*x^3+x^2)*exp(5)^2+3)*log(x)+(-
x^3-x^2)*exp(5)^2+3)*exp(((-x^3-x^2)*exp(5)^2+3)/(x^2*exp(5)^2*log(1/5*x/log(x))-x^2*exp(5)^2
2*x^3*exp(5)^2*log(x)*log(1/5*x/log(x))+x^3*exp(5)^2*log(x)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-\frac{x^3e^{10}}{x^2e^{10}\log\left(\frac{x}{5\,\log(x)}\right)-x^2e^{10}}-\frac{x^2e^{10}}{x^2e^{10}\log\left(\frac{x}{5\,\log(x)}\right)-x^2e^{10}}+\frac{3}{x^2e^{10}\log\left(\frac{x}{5\,\log(x)}\right)-x^2e^{10}}\right)}$$

43.58 Problem number 9031

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250\right.\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x^2\right)-}$$

Optimal antiderivative

$$e^{\ln\left(5+\left(\frac{e^x}{5+x}-4\right)^2-x-e^{-2}\right)^2}$$

command

```
integrate(((4*x+16)*exp(2)*exp(x)^2+(-16*x^2-144*x-320)*exp(2)*exp(x)+(-2*x^3-30*x^2-
150*x-250)*exp(2))*log((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-x^3+11*x^2+185*x+525)*exp(2
x^2-10*x-25)/(x^2+10*x+25)/exp(2))*exp(log((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-
x^3+11*x^2+185*x+525)*exp(2)-x^2-10*x-25)/(x^2+10*x+25)/exp(2))^2)/((5+x)*exp(2)*exp(x)^2+(-
8*x^2-80*x-200)*exp(2)*exp(x)+(-x^4+6*x^3+240*x^2+1450*x+2625)*exp(2)-x^3-15*x^2-75*x-
125),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\log\left(-\frac{x^3e^2}{x^2e^2+10\,xe^2+25\,e^2}+\frac{11\,x^2e^2}{x^2e^2+10\,xe^2+25\,e^2}-\frac{x^2}{x^2e^2+10\,xe^2+25\,e^2}+\frac{185\,xe^2}{x^2e^2+10\,xe^2+25\,e^2}-\frac{8\,xe^{(x+2)}}{x^2e^2+10\,xe^2+25\,e^2}-\frac{10\,x}{x^2e^2+10\,xe^2+25\,e^2}+\frac{525\,e^2}{x^2e^2+10\,xe^2+25\,e}\right.\right.}$$

43.59 Problem number 9135

$$\int \frac{e^{\frac{-x-e^{2x}x+\log\left(e^2x\right)}{-4+x}}\left(-4+5x+e^{2x}\left(4x+8x^2-2x^3\right)-x\log\left(e^2x\right)\right)}{16x-8x^2+x^3}\,dx$$

Optimal antiderivative

$$2+e^{\frac{\ln\left(e^2x\right)-x\,e^{2x}-x}{-4+x}}$$

command

```
integrate((-x*log(exp(2)*x)+(-2*x^3+8*x^2+4*x)*exp(2*x)+5*x-4)*exp((log(exp(2)*x)-
x*exp(2*x)-x)/(x-4))/(x^3-8*x^2+16*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(-\frac{xe^{(2\,x)}}{x-4}-\frac{x}{x-4}+\frac{\log\left(xe^2\right)}{x-4}\right)}$$

43.60 Problem number 9215

$$\int \frac{1}{3} e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}\left(2x+x^2\right)\right)\,dx$$

Optimal antiderivative

$$\mathrm{e}^{\frac{\left(\mathrm{e}^5+\mathrm{e}^x\right)\mathrm{e}^{\frac{6}{5}}x^2}{3}}$$

command

```
integrate(1/3*((x^2+2*x)*exp(3/5)^2*exp(x)+2*x*exp(3/5)^2*exp(5/2)^2)*exp(1/3*x^2*exp(3/5)^2*
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\frac{1}{3}x^2e^{\frac{31}{5}}+\frac{1}{3}x^2e^{\left(x+\frac{6}{5}\right)}\right)}$$

43.61 Problem number 9254

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$$

Optimal antiderivative

$$\mathrm{e}^{8x\,\mathrm{e}^{-2}+4x-\frac{8\ln(\ln(x))}{x}+4\,\mathrm{e}^{-1}x-2}$$

command

```
integrate((8*exp(1)*exp(2)*log(x)*log(log(x))+((4*x^2*exp(1)+4*x^2)*exp(2)+8*x^2*exp(1))*log(
8*exp(1)*exp(2))*exp((-8*exp(1)*exp(2)*log(log(x))+((4*x^2-2*x)*exp(1)+4*x^2)*exp(2)+8*x^2*ex
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(4xe^{(-1)}+8xe^{(-2)}+4x-\frac{8\log(\log(x))}{x}-2\right)}$$

43.62 Problem number 9330

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{(2e^5x+2e^xx)\log\left(\frac{e^5+e^x}{x}\right)}$$

Optimal antiderivative

$$\mathrm{e}^{\left(-\frac{1}{4}-\ln\left(2\ln\left(\frac{\mathrm{e}^5+\mathrm{e}^x}{x}\right)\right)\right)^2}$$

command

```
integrate((((-4+4*x)*exp(x)-4*exp(5))*log(2*log((exp(5)+exp(x))/x))+(-1+x)*exp(x)-
exp(5))*exp(log(2*log((exp(5)+exp(x))/x))^2+1/2*log(2*log((exp(5)+exp(x))/x))+1/16)/(2*exp(x)
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\log\left(2\,\log\left(\frac{e^5}{x}+\frac{e^x}{x}\right)\right)^2+\frac{1}{2}\,\log\left(2\,\log\left(\frac{e^5}{x}+\frac{e^x}{x}\right)\right)+\frac{1}{16}\right)}$$

43.63 Problem number 9649

$$\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+\left(8+4x^2\right)\log\left(x^2\right)+4x\log\left(e^{4/5}x\right)\log\left(x^2\right)+\left(-2+x+x^2\right)\log^2\left(x^2\right)\right)}{x^2}$$

Optimal antiderivative

$$\mathrm{e}^{x+\ln\left(x^2\right)^2\left(\frac{2}{x}+x+\ln\left(x\,\mathrm{e}^{\frac{4}{5}}\right)\right)}$$

command

```
integrate((4*x*log(x^2)*log(x*exp(4/5))+(x^2+x-2)*log(x^2)^2+(4*x^2+8)*log(x^2)+x^2)*exp((x*l
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(x\log\left(x^2\right)^2+\log\left(x^2\right)^2\log\left(xe^{\frac{4}{5}}\right)+x+\frac{2\,\log\left(x^2\right)^2}{x}\right)}$$

43.64 Problem number 9667

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}\left(144x\right.\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$

Optimal antiderivative

$$e^{x-\frac{9}{\left(\frac{4}{3x}-e^{\frac{\ln(5)}{5}}+x\right)^2}}$$

command

```
integrate((27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+(486*x^3+144*x)*exp(1/5*log
64)*exp((9*x^3*exp(1/5*log(5)+x)^2-24*x^2*exp(1/5*log(5)+x)-81*x^2+16*x)/(9*x^2*exp(1/5*log(5
24*x*exp(1/5*log(5)+x)+16))/(27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+144*x*exp
64),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: TypeError

Giac 1.7.0 via sagemath 9.3 output

$$e^{\left(\frac{9x^3e^{\left(2x+\frac{2}{5}\log(5)\right)}}{9x^2e^{\left(2x+\frac{2}{5}\log(5)\right)}-24xe^{\left(x+\frac{1}{5}\log(5)\right)}+16}-\frac{24x^2e^{\left(x+\frac{1}{5}\log(5)\right)}}{9x^2e^{\left(2x+\frac{2}{5}\log(5)\right)}-24xe^{\left(x+\frac{1}{5}\log(5)\right)}+16}-\frac{81x^2}{9x^2e^{\left(2x+\frac{2}{5}\log(5)\right)}-24xe^{\left(x+\frac{1}{5}\log(5)\right)}+16}+\frac{}{9x^2e^{\left(2x+\frac{2}{5}\right.}}\right.}$$

43.65 Problem number 9708

$$\int \frac{e^5\left(-e^{21}-3x^2\right)\log(3)}{\left(e^{21}x+x^3\right)^2}\,dx$$

Optimal antiderivative

$$e^{5+\ln\left(\frac{\ln(3)}{\left(e^{21}+x^2\right)x}\right)}$$

command

```
integrate((-exp(21)-3*x^2)*exp(log(log(3)/(x*exp(21)+x^3))+5)/(x*exp(21)+x^3),x, algorithm="g
```

Giac 1.9.0-11 via sagemath 9.6 output

Exception raised: NotImplementedError

Giac 1.7.0 via sagemath 9.3 output

$$\frac{e^5\log(3)}{x^3+xe^{21}}$$

43.66 Problem number 9784

$$\int \frac{e^{5x}\left(-45x+15x^2+e^x\left(15x^2-5x^3\right)\right)+\left(36-24x+e^x\left(-12x+8x^2\right)\right)\log\left(e^{-x}(-3+e^x x)\right)+\left(-36x+12x^2+e^{\cdots}\right.}{9x-3x^2+e^x\left(-3x^2+x^3\right)}$$

Optimal antiderivative

$$4\ln\left(\frac{1}{3}x^2-x\right)\ln\left(x-3\,\mathrm{e}^{-x}\right)-\mathrm{e}^{5x}$$

command

```
integrate((((8*x^2-12*x)*exp(x)-24*x+36)*log((exp(x)*x-3)/exp(x))+((4*x^2-12*x)*exp(x)+12*x^2
36*x)*log(1/3*x^2-x)+((-5*x^3+15*x^2)*exp(x)+15*x^2-45*x)*exp(5*x))/((x^3-3*x^2)*exp(x)-
3*x^2+9*x),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\begin{aligned}&4\,x\log\left(3\right)-4\,\log\left(3\right)\log\left(xe^x-3\right)-4\,x\log\left(x-3\right)\\&\quad+4\,\log\left(xe^x-3\right)\log\left(x-3\right)-4\,x\log\left(x\right)+4\,\log\left(xe^x-3\right)\log\left(x\right)-e^{\left(5\,x\right)}\end{aligned}$$

43.67 Problem number 10096

$$\int \frac{8000+4800x+960x^2-56x}{\left(8000x+4800x^2+960x^3+44x^4-4x^5+\left(6000x+2400x^2+240x^3-5x^4\right)\log(x)+\left(1500x+300x^2\right)\log^2(x)+\right.}$$

Optimal antiderivative

$$\ln\left(\ln\left(\frac{\left(x-\frac{x^4}{\left(4x+20+5\ln(x)\right)^2}\right)^2}{x}\right)\right)$$

command

```
integrate((125*log(x)^3+(300*x+1500)*log(x)^2+(-35*x^3+240*x^2+2400*x+6000)*log(x)-
12*x^4-56*x^3+960*x^2+4800*x+8000)/(125*x*log(x)^3+(300*x^2+1500*x)*log(x)^2+(-5*x^4+240*x^3+
4*x^5+44*x^4+960*x^3+4800*x^2+8000*x)/log((625*x*log(x)^4+(2000*x^2+10000*x)*log(x)^3+(-
50*x^4+2400*x^3+24000*x^2+60000*x)*log(x)^2+(-80*x^5+880*x^4+19200*x^3+96000*x^2+160000*x)*lo
32*x^6-64*x^5+4320*x^4+38400*x^3+128000*x^2+160000*x)/(625*log(x)^4+(2000*x+10000)*log(x)^3+(
```

Giac 1.9.0-11 via sagemath 9.6 output

Timed out

Giac 1.7.0 via sagemath 9.3 output

$$\log\left(-\log\left(x^6-32\,x^5-80\,x^4\log\left(x\right)-50\,x^3\log\left(x\right)^2-64\,x^4\right.\right.\\ \left.+880\,x^3\log\left(x\right)+2400\,x^2\log\left(x\right)^2+2000\,x\log\left(x\right)^3+625\,\log\left(x\right)^4\right.\\ \left.+4320\,x^3+19200\,x^2\log\left(x\right)+24000\,x\log\left(x\right)^2+10000\,\log\left(x\right)^3+38400\,x^2\right.\\ \left.+96000\,x\log\left(x\right)+60000\,\log\left(x\right)^2+128000\,x+160000\,\log\left(x\right)+160000\right)\\ +\log\left(256\,x^4+1280\,x^3\log\left(x\right)+2400\,x^2\log\left(x\right)^2+2000\,x\log\left(x\right)^3+625\,\log\left(x\right)^4\right.\\ \left.+5120\,x^3+19200\,x^2\log\left(x\right)+24000\,x\log\left(x\right)^2+10000\,\log\left(x\right)^3+38400\,x^2\right.\\ \left.+96000\,x\log\left(x\right)+60000\,\log\left(x\right)^2+128000\,x+160000\,\log\left(x\right)+160000\right)-\log\left(x\right)\Big)$$

43.68 Problem number 10193

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\Big(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)\\ +\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\Big)\,dx$$

Optimal antiderivative

$$\left(\ln(x)-2\right)x^2\mathrm{e}^{-\mathrm{e}^{\left(\mathrm{e}^{16}+x-1\right)^2}}$$

command

```
integrate((((-2*x^2*exp(16)-2*x^3+2*x^2)*exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-2*x+1)+2*x)*log(x
4*x^2)*exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-2*x+1)-3*x)/exp(exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-
2*x+1)),x, algorithm="giac")
```

Giac 1.9.0-11 via sagemath 9.6 output

could not integrate

Giac 1.7.0 via sagemath 9.3 output

$$\left(x^2e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{16}-e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{16}+1\right)}+1\right)}\log\left(x\right)-2\,x^2e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{16}-e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{1}\right.\right.}\right.$$