

Discussion 4 - practice problems for MidExam1. Wed Oct 10

problem 1. Consider The convolution $y(t) = x(t) * h(t)$ with

$$x(t) = \cos(\pi t) \cdot [u(t+1) - u(t-1)]$$

$$h(t) = u(t+1) - u(t-1)$$

Compute $y(t)$ For $t < 0$

problem 2. Calculate all Fourier Series Coeff. of signal $x(t)$

$$x(t) = \sin\left(\frac{3\pi t}{2}\right) + \cos(7\pi t)$$

identify all frequencies? - what is the fundamental frequency ω_0 ?

problem 3. obtain Discrete Convolution of

$$y(n) = x(n) * h(n)$$

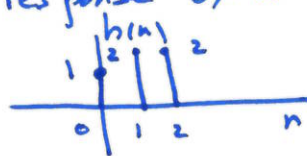
where

$$x(n) = a^n u[n-5]$$

$$h(n) = u(-n)$$

Assuming $|a| < 1$

problem 4. The impulse response of a discrete LTI system is



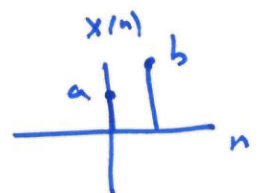
$$h(n) = [1 \ 2 \ 2]$$

\uparrow
 $n=0$

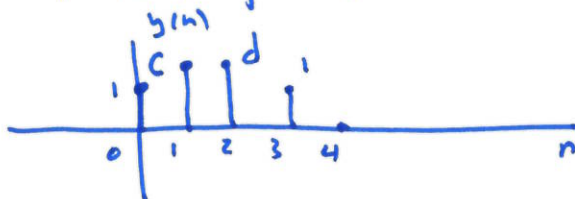
when input $x(n)$ is

$$x(n) = [a \ b]$$

\uparrow
 $n=0$



if the output $y(n)$ is



Find $\begin{bmatrix} a = ? & b = ? \\ c = ? & d = ? \end{bmatrix}$