HW 6
Electronic Communication Systems
Fall 2008
California State University, Fullerson

Nasser M. Abbasi

Fall 2008 Compiled on May 29, 2019 at 11:25pm

Contents

HW and key are missing.

1 Questions

8.35 Consider a wide-sense stationary process $X(t)$ having the power spectral density $S_X(f)$ shown in Fig. 8.26. Find the autocorrelation function $R_X(\tau)$ of the process $X(t)$.

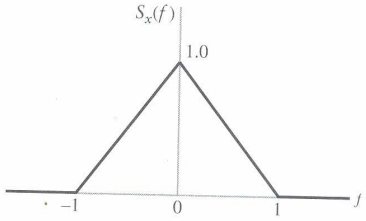

FIGURE 8.26 Problem 8.35.

8.36 The power spectral density of a random process $X(t)$ is shown in Fig. 8.27.

(a) Determine and sketch the autocorrelation function $R_X(\tau)$ of $X(t)$.

(b) What is the dc power contained in $X(t)$?

(c) What is the ac power contained in $X(t)$?

(d) What sampling rates will give uncorrelated samples of $X(t)$? Are the samples statistically independent?

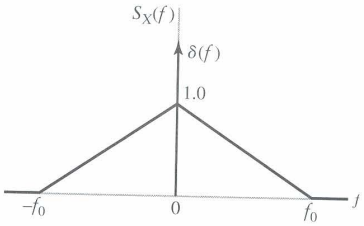

FIGURE 8.27 Problem 8.36.

8.37 Consider the two linear filters shown in cascade as in Fig. 8.28. Let $X(t)$ be a stationary process with autocorrelation function $R_X(\tau)$. The random process appearing at the first filter output is $V(t)$ and that at the second filter output is $Y(t)$.

(a) Find the autocorrelation function of $V(t)$.

(b) Find the autocorrelation function of $Y(t)$.

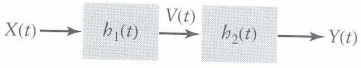

FIGURE 8.28 Problem 8.37.

8.38 The power spectral density of a narrowband random process $X(t)$ is as shown in Fig. 8.29. Find the power spectral densities of the in-phase and quadrature components of $X(t)$, assuming $f_c = 5$ Hz.

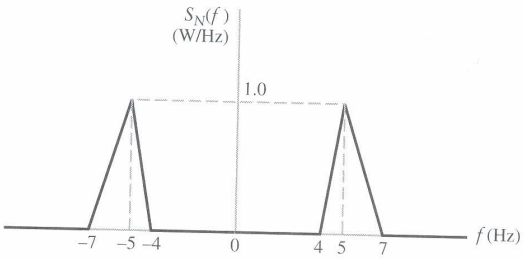

FIGURE 8.29 Problem 8.38.