Assignment 12

Kummitha Jhanavi (CS21BTECH11032)

June 11, 2022

Outline

Question

Standard Block

Given a normal process x(t) with $\eta_x = 0 and R_x(\tau) = 4e^{-2|\tau|}$, we from the random variables z= x(t+1), w =x(t-1),
(a). find E(zw) and $E[(z+w)^2]$.
(b) find $f_z(z) P(z < 1) f_{zw}(z, w)$

Solution

(a).

$$E(zw) = R_x(2) = 4e^{-4} \tag{1}$$

$$E(z^2) = E = (w^2) = R_x(0) = 4 \tag{2}$$

$$E((z+w)^2) = R_x(0) + R_x(0) + 2R_x(2) = 8(1+e^{-4}) \tag{3}$$

(b).z is N(0,2)

$$P(z < 1) = F_z(1) = G(1/2) \tag{4}$$

$$r_{zw} = e^{-4} \tag{5}$$

$f_{zw}(z, w) : N(0, 0; 2, 2; e^{-4})$