Assignment 14

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Papoulis chap 12 Exercise 12-3

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Problem

Q)Show that if $\mathbf{x}(t)$ is normal with $\eta_x = 0$ and $R_x(\tau) = 0$ for $|\tau| > a$, then it is correlation-ergodic.

Solution

if $\tilde{x}(t)$ is normal, then

$$C_{zz}(\tau) = R_x(\lambda + \tau)R_x(\lambda - \tau) + R_x^2(\tau) \tag{1}$$
$$\tilde{z} = \tilde{x}(t + \lambda)\tilde{x}(t) \tag{2}$$

if, $R_x(\tau) = 0$ for $|\tau| > a$, then $C_{zz}(\tau) = 0$ for $|\tau| > \lambda + a$
from (1) it follows that if $C(\tau) \to 0$, as $C_{zz}(\tau) \to 0$ as $\tau \to \infty$
hence $\tilde{x}(t)$ is covaraiance-ergodic

CODES

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