Stochastic Processes   November 21, 2021
Sharif University of Technology   CE 40-695
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Time: 20 mins

Name: Std. Number:

Quiz 3 (Ergodicity and LTI systems)

Questions

1. Short Questions :

   (a) Suppose a random process $x(t) = A$ where A is a uniform random variable between $(-1, 1)$. Is this R.P. ergodic in mean? Justify your answers.

   (b) If the input to a causal LTI system is WSS, output is guaranteed to be WSS. (Justify your answers)

2. Suppose $X(t)$ and $w(t)$ random processes with $R_{xx}(\tau) = 2e^{-|\tau|}$ and $R_{ww}(\tau) = \delta(\tau)$. Suppose $w(t)$ is input to a stable causal LTI system with differential equation

$$\frac{dx(t)}{dt} + ax(t) = bw(t)$$

   Determine a, b.