Statistical Learning February 23, 2019
Sharif University of Technology CE 40-956
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Time: 25 mins

Name: Std. Number:

Quiz 1 (Gaussian Processes)

Questions

1. Let $\{X(t); t \in \mathbb{R}\}$ be defined by $X(t) = tA$ for all $t \in \mathbb{R}$ where $A \sim N(0, 1)$. Show that $X(t)$ is a Gaussian process. Find its mean for each t and its covariance function.

2. Let $\{W(n); n \in \mathbb{Z}\}$ be a discrete Gaussian Process for which we have $W(n) \sim N(0, 1)$.
   (a) Find the mean and autocovariance function of this process. Is it *WSS*?
   (b) Let $\{S(n) = W(1) + W(2) + ... + W(n); n \geq 1\}$ be a new cumulative process.
   - Show that $S(n)$ is also a gaussian process.
   - Find it's mean and autocovariance function. Is $S(n)$ stationary in any sense?