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BIEEE-015

B.Tech. - VIEP - ELECTRICAL ENGINEERING (BTELVI)

00562

Term-End Examination

June, 2019

BIEEE-015 : STOCHASTIC CONTROL SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt **any seven** questions.*

*(ii) Each question carries **equal** marks.*

(iii) Use of scientific calculator is permitted.

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1. (a) Distinguish between deterministic and random signals. **6**

(b) Check whether the following signals are deterministic or random : **4**

(i) $x(t) = 10 \sin 2\pi t$

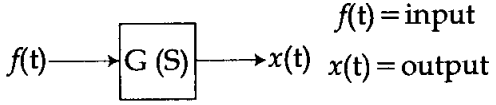
(ii) $x(t) = \begin{cases} 1 & t \geq 0 \\ 0 & t < 0 \end{cases}$

(iii) $X(t) = 10 \sin (2\pi t + \theta)$

(iv) $X(t) = A \sin (2\pi t + \theta)$

2. Explain Gauss - Markov sequence model of stochastic process. Write the expressions for auto correlation and spectral functions. **10**

3. Consider a first-order low pass filter with unity white noise as the input as shown in the following figure. **10**



Where G(S) = X(S)/F(S) is the transfer function. Determine the output spectral function and sketch.

4. (a) What is optimal filtering for discrete linear systems ? Explain. **5**
   (b) What are the different measurement errors occur in optimal filtering ? Explain. **5**

5. Define the following in context to optimal filtering : **10**
   (a) Fixed-point smoothing
   (b) Fixed-lag smoothing

6. Explain the single stage and double stage optimal smoothing process for discrete linear systems. **10**

7. Enumerate the different methods used for stochastic optimal control in discrete linear system. **10**

8. Write short notes on **any two** of the following : **2x5=10**
   (a) Wiener process
   (b) Mathematical estimation problem for discrete systems
   (c) Discrete filtering