Code No: EE1904 **R14**

M.Tech I Semester Regular Examinations, April-2015

STOCHASTIC ESTIMATION AND CONTROL
(Control Systems)

Time: 3 Hours **Max. Marks: 60**

Note: Answer any Five Questions. All questions carry equal marks

1. a) Define stochastic process and explain it with an example? [6M]
   b) Obtain the relationship between Discrete-time and Sampled Continuous- time Gauss-Markov processes? [6M]
2. What are the various classes of smoothing problems for discrete linear system? Explain fixed-lag smoothing for discrete linear system? [12M]
3. Discuss the concept of optimal filtering and prediction for continuous linear systems? [12M]
4. Explain Gauss–Markov process model in detail? [12M]
5. Explain double stage optimal smoothing for discrete linear systems? [12M]
6. Define deterministic problem and write the detailed procedure to solve deterministic problem? [12M]
7. What is optimal estimation? Explain optimal estimation process for discrete linear systems? [12M]
8. Show that the optimal filter for all admissible loss functions is governed by the relations [12M]

$$\hat{x}\left(\frac{(k+1)}{k+1}\right) = \Phi(k+1,k)\hat{x}\left(\frac{k}{k}\right) + k(k+1)\left[z(k+1) - H(k+1)\Phi(k+1,k)\hat{x}\left(\frac{k}{k}\right)\right]$$

$$P\left(\frac{(k+1)}{k}\right) = \Phi(k+1,k)P(k/k)\Phi'(k+1,k) + \gamma(k+1,k)Q(k)\gamma'(k+1,k)$$

For k=0,1,2……., where $\hat{x}\left(\frac{0}{0}\right) = 0$

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