

**B.Tech. – VIEP – ELECTRICAL ENGINEERING
(BTELVI)**

Term-End Examination

December, 2016

00093

BIEEE-015 : STOCHASTIC CONTROL SYSTEMS

Time : 3 hours

Maximum Marks : 70

Note : Attempt any *five* questions. Each question carries equal marks. Use of scientific calculator is allowed.

1. (a) Explain about the different elements of the theory of stochastic process. 5
(b) Differentiate between Gauss-Markov sequence model and Gauss-Markov process model with their proper applications. 9

2. Describe the best linear estimator property of the Kalman filter. Explain the signal-to-noise ratio improvement property of the filter. 7+7

3. What do you mean by optimal prediction of a discrete linear system ? Discuss the performance of an optimal filter in the presence of time correlated disturbances and measurement errors. 5+9

4. Explain single-stage and double-stage optimal smoothing for discrete linear systems. 7+7
5. Discuss the difference between optimal fixed-interval smoothing and optimal fixed-point smoothing. Write the advantages and disadvantages of each. 9+5
6. (a) Why is LQR problem preferred over conventional pole placement technique ? Explain with proper justification. 7
- (b) Formulate a continuous filtering equation for a stochastic optimal linear control system as a special case of discrete filtering equation. 7
7. Write short notes on any **two** of the following : 2×7=14
- (a) Optimal fixed-lag smoothing
- (b) Optimal estimation for discrete systems
- (c) Statistical distributions
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