Code No: J4503/R16

M. Tech. II Semester Regular Examinations, May-2017

DETECTION AND ESTIMATION THEORY

(Common to SSP (45), DIP (63), CE&SP (46), IP (-), C & SP (80))

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

Answer any FIVE Questions
All Questions Carry Equal Marks

1. a Explain about the procedure in detection of random signals in Noise. [6M]
   b Explain about Gaussian Processes and point processes. [6M]

2. a What you understand by Composite Hypothesis Testing? Explain in detail [6M]
   b Explain quantitatively about Minimum Probability of error criterion for the detection of signals in Noise. [6M]

3. a Consider the problem of finding the linear fit to the data set {xi, yi}, i =1,2,….N, using the relation y = A + Bx. Find the MMSE estimates for A and B. [6M]
   b With neat sketch, explain real time digital wiener filters with its mathematical analysis. [6M]

4. a The N observations x[n], n = 0,1,…N-1, are i.i.d. samples from a Rayleigh distribution $p(x[n];\lambda) = (x[n]/\lambda.\exp(-x[n]^2/2\lambda)$ for x[n] > 0, and 0 otherwise. Find a sufficient statistic for estimation of λ. [6M]
   b Define Probability Distributive and density functions and list out their properties. [6M]

5. a Define auto correlation matrix of a random process and list out its properties. [6M]
   b Define wide sense stationary random process? Explain the tests for stationary. [6M]

6. a Breifly explain about Test of hypothesis. [6M]
   b Explain in detail about power special density functions. [6M]

7. a Explain about the estimation and detections with applications. [6M]
   b When does the LRT test under minimum probability of error criterion become identical to that under NP criterion? [6M]

8. a Distinguish between Weiner and Kalman filters. [6M]
   b What is the difference between point and interval estimators? Explain any one method of evaluating the interval estimators. [6M]

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