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## M.Tech I Semester Supplementary Examinations August 2016

## ADAPTIVE SIGNAL PROCESSING

(Digital electronics & Communication Systems) (For students admitted in 2012, 2013, 2014 & 2015 only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions All questions carry equal marks

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- (a) Define expectation in case of discrete random processes and hence explain clearly the importance of variance and covariance in respect of two processes x(u) and y(u).
  - (b) State and prove unitary and similarity transformation theorem of Eigen vectors.
- 2 (a) What is the difference between open loop and closed loop adaptations? Mention and explain their applications with necessary diagrams.
  - (b) What is an adaptive linear combiner? Derive and explain its performance surface.
- 3 (a) What are Wiener-Hopf equations? Derive an expression for the solution of the wiener-hopf equations.
  - (b) Derive expression for canonical form of the error performance surface.
- 4 (a) What is a learning curve? Derive and compare the learning curves of Newton's and steepest descent methods.
  - (b) What are different searching algorithms? Explain and derive the solution to a gradient search algorithm.
- 5 (a) What is an LMS algorithm? Draw the diagram of a side lobe canceller and explain its operation.
  - (b) What is an adaptive beam forming? Explain the circuit with necessary mathematical expressions.
- 6 (a) Derive the necessary expression for the convergence of an RLS algorithm.
  - (b) Explain the application of RLS algorithm in adaptive equalization.
- 7 (a) Draw the block diagram of a Kalman filter based on one step prediction and derive necessary equations.
  - (b) Derive and explain about the correlation matrix of the innovative process.
- 8 Write short notes on the following:
  - (a) Fundamental assumptions for blind de-convolution.
  - (b) Inverse filter and its realization.

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