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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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1 (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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