ADAPTIVE SIGNAL PROCESSING

Module – I(10 Hours)

Introduction: Adaptive Systems – Definition and characteristics, General properties, Open and Closed Loop Adaptations, Applications

The Adaptive Linear Combiner: Performance function, Gradient and Mean Square Error, Examples.

Module – II(14 Hours)

Theory of Adaptation with Stationary Signals: Properties of the Quadratic Performance Surface, Significance of eigen values, eigen vectors, coorelation matrix.

Searching the Proformance Surface: A simple gradient search algorithm, Stability and Rate of convergence, the learning curve

Gradient Estimation and its effects on Adoption: The performance penalty, Variance of the gradient estimate, Misadjustment.

Module – III(16 Hours)

Adaptive Algorithms and Structures: The LMS Algorithm, Convergence, learning Curve, Performanece analysis, Filtered X LMS algorithm,

Applications: Adaptive Modeling and System Identification using adaptive filter, Inverse Adaptive Modeling, Deconvolution, and equalization using adaptive filter, Adaptive Control Systems using Filtered X LMS Algorithm, Adaptive Noise Cancellation using Adaptive filter

Text Books :

1. Bernard Widrow and Samuel D. Stearns, *Adaptive Signal Processing*, Pearson Education, 2nd impression 2009.

Reference Book:

1. Simon Haykin, *Adaptive Filter Theory*, 4th Edn., Pearson Education.