Massachusetts Institute of Technology
Department of Electrical Engineering and Computer Science

6.432 STOCHASTIC PROCESSES, DETECTION AND ESTIMATION

Recitation 9 Outline

April 7, 2004

Discrete Time Processes and Linear Systems

1. Discrete time power spectral densities

   - Definition and properties: analogies to continuous time
   - Example: $K_{xx}[n] = \sigma^2 \alpha^{|n|}$

2. Discrete time processes through linear systems

   - First order statistics: mean
   - Second order statistics: covariance and cross–covariance
   - Relation between temporal and spectral representations

3. Spectral factorization

   - Problem statement, uniqueness of solution
   - Example: $K_{xx}[n] = \sigma^2 \alpha^{|n|}$

Discrete Time Karhunen–Loeve Expansion

1. Problem statement

2. Solution: eigendecomposition of covariance matrix