

Stochastic Processes and Time Series Econometrics: 311

Lars Peter Hansen

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Abstract

This course develops and applies time series statistical methods for the analysis of dynamic economic models. It develops tools from probability theory, statistics and decision theory and uses them to study linear and nonlinear models of economic time series. These tools support applications in empirical macroeconomics and finance.

Course Outline¹

1. Statistical models as consequences of the Law of Large Numbers - three lectures
 - (a) Exchangeability versus independent and identically distributed
 - (b) Stationarity versus ergodicity
 - (c) Things to do with a Law of Large Numbers
 - (d) Processes with stationary increments
2. Markov processes – two lectures
 - (a) Stationarity revisited
 - (b) Ergodicity revisited
3. Filtering and recursive learning – three lectures
 - (a) Learning parameters
 - (b) Hidden discrete state models
 - (c) Kalman filter
 - (d) Applications
4. Decision theory – two lectures
 - (a) Who is making decision: econometrician? policy maker? economic agents inside a model?
 - (b) Decision theory components
 - (c) Decision theoretic concepts
5. Stochastic growth, likelihood ratios as martingales, long term uncertainty, central limit theory – two lectures
6. GMM estimation of partially specified models – four lectures
 - (a) Motivation and applications
 - (b) Foundations

¹This is a “dynamic and stochastic” outline: more details will be added as lectures occur and students pose questions.