

Lecture 5 Outline

1. Duality between Kalman filtering and LQG control.
2. Muth's example (again).
3. The Kalman filter vs. the Wonham filter.
4. Comments on nonlinear filtering. The EM algorithm & extended Kalman filter.
5. Agents as Econometricians. Nonlinear filtering or Robust linear filtering?
6. Intro to Model Uncertainty & Robust Control.
History of Thought: Knight (1921), Keynes (1936), Savage (1954), Ellsberg (1961), Gilboa & Schmeidler (1989), Hansen & Sargent (2008).
7. The Ellsberg Paradox & the Sure Thing Principle
8. Engineering vs. Economics:
Axioms, Discounting, Detection Error Probabilities, and Multiple Agents.
9. Axioms: Links between Variational Preferences (MMR (2006)), Smooth Ambiguity (KMM (2005)), & Multiplier Preferences (HS (2001)). Alternative definitions of ambiguity aversion.
10. Dynamics. Recursive Preferences, Compound Lotteries & the timing of the Resolution of Uncertainty.
11. A pervasive Legendre Transform Duality. Preferences vs. Environment. Back to the Lucas Critique.
12. Visualizing Model Misspecification: Outside (White (1982), Vuong (1989)) vs. Inside (Hansen & Sargent)
13. Hansen, Sargent & Tallarini (1999). Robustness induced precautionary saving. Observational equivalence. The price of model uncertainty.