SS 201c: Analytical Foundations of Social Science

1. Instructor: Federico Echenique
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   Lectures: Tuesdays and Thursdays 10.30–11.55 am, 128 Baxter.
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2. Texts: Bewley, *General Equilibrium, Overlapping Generations Models and Optimal Growth Theory*
   Sundaram, *A First Course in Optimization Theory*
   Stokey and Lucas *Recursive Methods in Economic Dynamics*,
   Mailath and Samuelson *Repeated Games and Reputations*.
   Optional:
   Fudenberg and Tirole, *Game Theory*
   Osborne and Rubinstein, *A Course in Game Theory*.

3. Syllabus

   (a) Dynamic Programming. Discounted dynamic programming. Contraction Mapping Theorem. Bellman Equation. Numerical dynamic programming. Applications in economics. Read: Sundaram Ch. 11 and 12, Stokey and Lucas Ch. 3 and 4.

   (b) Dynamic Economies One-sector optimal growth model. Overlapping generations. Optimality. Social Secutiry. Turnpike theorem. Bewley Ch. 9 and 10.

   (c) Repeated Games with Perfect and Imprefect Monitoring. One-step deviation principle. APS self-generation. Folk Theorems (Nash reversion, n-player, and the Fudenberg-Levine-Maskin Theorem). Comparative statics of equilibrium payoffs. Read: Fudenberg and Tirole, Ch. 5.1, 5.5.and 5.6.

   (d) Reputation. The Chain-Store Paradox. Reputation in finitely and infinitely repeated games. Read: Fudenberg and Tirole, Ch. 9.

   (e) Stochastic Games. Markov-Perfect Equilibrium: Existence and applications in economics. Read: Fudenberg and Tirole, Ch. 13.

(f) Cooperative Game Theory. Transferable-utility games: The Core (Bondareva-Shapley Theorem). Market Games. The Von-Neumann-Morgenstern solution. The Shapley Value. Nash Bargaining. Read: Osborne and Rubinstein, Ch. 13, 14 and 15.