JEM 096 Economic Dynamics I

1. First order differential equations. Phase plots and direction fields. Phase diagram of autonomous equation. Phase diagram of the Solow growth model.
2. First order differential equations. Solution methods: qualitative and quantitative.
3. Second order differential equations and their solution methods.
4. Difference equations: staircase diagrams, stability, equilibrium. Solow model in discrete time. Logistic equation. Chaos.
5. Solution methods of difference equations.
6. Systems of differential equations. Stability and instability. Types of qualitative solutions: nodes, spirals and saddles
7. Systems of differential equations: Definitions, Eigenvalues and eigenvectors, solution methods.
8. Discrete Systems: Definitions, Eigenvalues and eigenvectors Stability of discrete systems, Internal and external balance
9. Dynamic optimization: Hamiltonian principle. Applications.
10. Dynamic optimization and discounting. Applications.
11. Textbook model of overshooting (dynamics of a flexible exchange rate)
12. Closed economy dynamics: derivation and dynamics of the IS-LM model
13. Open economy dynamics: sticky prices model
14. Ramsey model and derivation of the Euler equation.
15. The q-theory of investment. Dynamics of the model.