- 3. Simple syntax, introduction to the solvers
 - NLP (non-linear programming, used in constrained optimization)
 - MCP (mixed complementarity programming for nxn systems of equations and inequalities in n bounded (e.g., non-negative) unknowns)

direct solution as an NLP (non-linear programming) problem solution using first-order condition as an MCP (mixed complementarity problem) derivation of the cost function and alternative MCP solution.

4. Theory light: the Karush-Kuhn-Tucker theorem

fundamental result for optimization. Tells us we can convert a non-linear constrained optimization problem into a set of equations and inequalities in matched variables.

5. Introduction to complementarity

example of supply and demand: three types of solutions to two inequalities and unknowns with non-negative price and quantity correspondence between equations and unknowns use and interpretation of marginals (aka slack variables)

6. Maximizing utility subject to a budget constraint

formulated as an nlp formulated as an mcp using the KKT (first-order) conditions interpreting marginals as shadow values and Lagrangean multipliers deriving Marshallian demand functions deriving Hicksian demand functions, expenditure functon

Preliminary and incomplete - January 12, 2015

- 7. Brief presentation of the Newton method for solving nxn problems
- Introduction to general equilibrium modeled as a complementarity problem Intro2.pdf, Part B conditions for equilibrium: zero profits, market clearing, income balance micro consistency
- 9. A basic two-good, two-factor general-equilibrium model model M21.gms assessing and interpreting counter-factuals
- 10. Variations on the basic model specific factors of production, income distribution slack activities; e.g., solar and wind power unprofitable at market prices labor-leisure choice two households with different preferences, income distribution
- Taxes, distortions, public goods and bads benchmarking with taxes labor supply and distortionary income taxes equal-yield tax reform with endogenous labor-leisure choice modeling a public good or bad (pollution) endogenous, optimal provision of the public good
- 12. Open (tradiing) economy models modeling a small open economy tariffs versus real trade costs small economy with a benchmark tariff quantitative restriction such as a quota modeled as an endogenous tax equivalent modeled as a license: an artificial commodity benchmark trade imbalance large open economies and the optimal tariff argument
- Increasing returns to scale and imperfect competition simple monopoly, markup formulae oligopoly with free entry and exit monopolistic competition
- 14. Added topics

games with continuous strategies as a complementarity problem sets and conditionals games with discrete strategies balancing a matrix to achieve micro-consistency comparative steady-state analysis

Policies, Etiquette

E-mail policy: you may email me with small questions, but I tend not to answer questions that have been answered twice in class. *You are responsible for what is presented in class, including revisions to the syllabus and changes in mid-term dates.*

Class attendance policy: Since there is no textbook and we are making things up as we go along, class attendance is mandatory.

Athletics, clubs events, religion, weddings, etc. policy: all these things are known well ahead of time. If you have a conflict with an exam, tell me this week or forever hold your peace.

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who are found to be in violation of the academic inte