Syllabus

Solving Quantitative Equilibrium Models

• **Instructor:** Michael Reiter ([michael.reiter@ihs.ac.at](mailto:michael.reiter@ihs.ac.at)), office hours by appointment

• **Credits:** 4 ECTS

• **Term:** … 2017-2018

• **Course level:** PhD

• **Prerequisites:** Knowledge about macroeconomic models and some solution methods, as is taught for example in the course "Advanced Macroeconomics".

Course description

In the course we discuss numerical techniques for solving dynamic stochastic general equilibrium models on the computer, with a special focus on heterogeneous agent models.

The main programming tool will be a toolkit written by myself in the new programming language Julia, which is not difficult to handle for students which are familiar with programming in Matlab. The analysis of the results can be performed in either Julia or Matlab.

Learning outcomes

Understanding the theoretical basis of numerical solution techniques.

Solving DSGE models with nonlinear methods.

Solving and analyzing heterogenous agent models using a variety of techniques.

Reading list


Assessment

- The grade will be based on a sequence of problem sets (50%) and an individual project at the end of the class (50%).
Course schedule and materials for each session

Lecture 1: Efficient methods for dynamic programming (Judd 1998)

Lecture 2: Perturbation methods (Judd 1998)

Lecture 3: Projection methods (Judd 1992)

Lecture 4: Taylor projection (Levintal 2017)

Lecture 5: Solving large OLG models (Reiter 2015)

Lecture 6: Heterogeneous agents (HA): the Krusell/Smith method (Krusell and Smith 1998)

Lecture 7: Linearization methods for HA models (Reiter 2009; Boppart, Krusell, and Mitman 2017)

Lecture 8: Solution by smooth approximation of the distribution (Winberry 2017)

Lecture 9: Optimal state aggregation for linearized solution of HA models (Reiter 2010a)

Lecture 10: HA methods in continuous time (Ahn, Kaplan, Moll, Winberry, and Wolf 2017)

Lecture 11: Global solutions for HA models (class notes)

Lecture 12: Comparing the different solution methods (class notes)