

CGDE (Central Germany Doctoral Program Economics)

## Dynamic Macroeconomics

### Methods and Numerical Simulation with Applications to Climate Change, Dynamic Resource Models and Endogenous Growth

**Date:** October 17-20, 2023

**Lecturer:** Prof. Dr. Timo Trimborn (Aarhus University), [tt@econ.au.dk](mailto:tt@econ.au.dk)

**Venue:** Leipzig University, Grimmaische Straße 12, 04109 Leipzig, room I 411

**Format:**

Four days interactive lectures (see schedule below). Students are required to bring a laptop with Matlab installed.

**Topics:**

The course deals with methods to analyze and numerically solve continuous-time deterministic models. We discuss methods which can be used to analyze this class of models theoretically. The focus is on models which exhibit multiple steady states. We apply the Relaxation algorithm in order to solve the adjustment dynamics of models numerically. As examples, we focus on endogenous growth models, dynamic resource models and Integrated Assessment models.

1. Introduction to Models of Economic Growth
2. Numerical solution of growth models I
3. Growth models
  - a) a simple endogenous growth model
  - b) non-renewable resource models (Dasgupta-Heal-Solow-Stiglitz)
  - c) a simple Integrated Assessment Model of climate change
4. Theoretical analysis of growth models
5. Numerical solution of growth models with a special focus on multiple steady states II
6. Numerical simulations of Integrated Assessment Models and policy implications

**Literature:**

The lecture is based on original research papers. A detailed list will be provided at the beginning of the lecture.

**Time schedule:****Tue, Oct 17**

09:30 – 11:00	Introduction, Numerical solutions of growth models I
11:00 – 11:30	Break
11:30 – 13:00	Numerical solutions of growth models I
13:00 – 14:30	Lunch break
14:30 – 16:00	Numerical solutions of growth models I

**Wed, Oct 18**

09:30 – 11:00	Growth models: a simple endogenous growth model
11:00 – 11:30	break
11:30 – 13:00	Growth models: Dasgupta-Heal-Solow-Stiglitz model
13:00 – 14:30	Lunch break
14:30 – 16:00	Growth models: a simple IAM

**Thu, Oct 19**

09:30 – 11:00	Theoretical analysis of growth models
11:00 – 11:30	break
11:30 – 13:00	Numerical solution of growth models II
13:00 – 14:30	Lunch break
14:30 – 16:00	Numerical solution of growth models II

**Fri, Oct 20**

09:00 – 10:30	Numerical Solutions of IAMs
10:30 – 11:00	break
11:00 – 12:30	Numerical Solutions of IAMs
12:30 – 14:00	Lunch break
14:00 – 15:30	Numerical Solutions of IAMs, conclusion