



Machine Learning for Macroeconomic Modeling

Instructor: Tato Khundadze, The New School of Social Research

Course outline

This course aims to provide participants with an in-depth understanding of advanced modeling and control techniques applicable to economic systems. Through a combination of theoretical knowledge and practical case studies, students will explore Nonlinear Model Predictive Control (NMPC), machine learning, and dynamical systems identification. The course will also highlight the application of these concepts to urgent global challenges, including climate change and wealth disparities.

Lecture 1

- Nonlinear Model Predictive Control (NMPC) and the Implementation of the NMPC Package in Python

Lecture 2:

- Climate Models with NMPC in Python

Lecture 3:

- Unsupervised Learning – Case Study: Monetary Policy and the Evolution of Wealth Disparities

Lecture 4:

- Introduction to Deep Learning – Case Study: A Deep Learning Approach to Analysing Conspicuous Consumption Patterns Among U.S. Consumers

Lecture 5:

- Deep Reinforcement Learning and Its Application to Macroeconomics – Case Study: Using Reinforcement Learning and NMPC to Model Cooperative Fiscal Policy in the Euro Area

Lecture 6:

- An Introduction to Sparse Identification of Nonlinear Dynamical Systems (SINDy) and its Application in Macroeconomics

About the Trainer

Tato Khundadze is a political economist currently working as a Teaching and Research Assistant at the New School for Social Research in New York City, where he is pursuing his PhD in Economics. Additionally, he holds the position of Associate Professor of Economics at the Georgian American University in Tbilisi, where he teaches intensive courses in statistical analysis. His research interests include development economics, trade policy, and industrial policy.