Faculty of Law, Management and Economics
Dr. Constantin Weiser

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Advanced Time Series

Summer 2023

Assessment:
Homework

Time frame:
2h lecture; 2h tutorial

Content:

1. Introduction
   1.1. Time Series (Def.)
   1.2. Why Times Series?
   1.3. Structures (Trend / Season / Cycle)
   1.4. Structural Breaks
2. Simple Models for Time Varying Parameters
   2.1. Exponential Smoothing (with trend)
   2.2. Rolling Regression
3. Linear State-Space Models
   3.1. Bayes Statistic
   3.2. State-Space formulation
   3.3. Kalmann Filter
   3.4. Estimation of unknown hyper-parameters
   3.5. Example: AR-Models
   3.6. Example: Time-Varying-Parameter
4. Non-Linear/Non-Normal State-Space Models
   4.1. Particle Filter (Sequential Monte-Carlo)
   4.2. Example: Stochastic Volatility Model (non-linear)
   4.3. Example: Jump-Process (non-normal)
   4.4. Estimation of unknown parameters

Requirements:
Solid knowledge of statistics in general and probability theory in particular. Interest in data work with statistics software (here Stata). Willingness to actively participate.

Literature:
Prado/West (2010): “Time Series: Modeling, Computation, and Inference”, CRC Texts in Statistical Science (excerpts are provided)

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