SOE 1: Tutorial: Time Series Analysis in Sociophysics and Econophysics

Time: Sunday 16:00–18:00 Location: H10

Tutorial SOE 1.1 Sun 16:00 H10

Time Series Analysis in Sociophysics and Econophysics — •Johannes J. Schneider and •Tobias Preis — Center for Computational Research Methods in Natural Sciences, Johannes Gutenberg University of Mainz

In the last decades, an increasing number of physicists have applied models and methods from statistical physics to complex systems in various research fields, such as sociology, politology, finance, and economy, thus founding the new interdisciplinary research fields of sociophysics and econophysics. Due to the IT revolution, including the creation of large databases stored in data warehouses and the acceleration of business processes by replacing traditional ways of communication and transactions by modern electronic counterparts, nowadays a truly gargantuan amount of data is accessible for both elaborate applications and academic research. Based on these developments, the creation of models for the considered problems can be well founded and verified by the analysis of the available datasets. Thus, the first step is mostly to perform a statistical analysis of the available time series in order to detect the properties of the underlying system.

This tutorial will present both basic and advanced methods of time series analysis covering examples both from sociophysics and from econophysics. The focus will lie on two different scenarios: from sociophysics, election results and their impacts on the member numbers of large parties shall be studied. In econophysics, a plethora of information exists—this tutorial will concentrate on financial market datasets. These data can be investigated by basic methods, such as correlation measures and scaling exponents. Furthermore, advanced procedures based on pattern comparisons and renormalization methods shall be described.