Aspects of Functional Time Series Models and Estimation

Abstract:

Over the past three decades, the field of functional data analysis has grown significantly, driven by increasing interest in high-dimensional data obtained from continuous observations across time, space, and frequency. In many applications, such data arise naturally as functional time series, for instance as consecutive observations of curves recorded over equidistant time points. This talk provides an overview of modeling approaches for functional time series, highlighting selected theoretical aspects motivated by recent research. The main focus is on linear models in Hilbert spaces, such as functional autoregressive and moving average processes, which allow for a flexible description of temporal dependence in infinite-dimensional settings. In addition, functional time series with time-varying volatility are discussed through functional GARCH-type models. Finally, models designed to capture periodic behavior, including functional periodic ARMA processes, are introduced to account for seasonal or cyclic structures.