



Lecture series

on

Bootstrap for Time Series

by

Prof. Dr. Jens-Peter Kreiß, TU Braunschweig

March 4 and 6, 2019

10.15 am-11.45 am and 2.15 pm-3.45 pm

Venue: Institute for Mathematical Stochastics, Goldschmidtstr. 7, **SR 5.101**

Contents:

Lecture 1: Introduction to Bootstrap (March 4, 10.15 am)

Lecture 2: Introduction to Time Series Analysis (March 4, 2.15 pm)

Lecture 3: Bootstrapping Time Series in Time Domain (March 6, 10.15 am)

Lecture 4: Bootstrapping Time Series in Frequency Domain (March 6, 2.15 pm)

Abstract:

In this lecture series we discuss bootstrap methods for time series. The first part gives a brief mathematically oriented introduction to bootstrap methods in statistics. We discuss main ideas and consider some examples, starting with the most simple one, which is the sample mean, but also touch bootstrap failure. Crucial for the bootstrap is an adequate asymptotic theory in order to be able to answer the question, when does bootstrap work?

The second part is devoted to time series analysis. Well established theory for stationary time series, their characteristic quantities and central results in time as well as in so-called frequency domain will be presented. Light will be shed on important classes of time series models and relevant statistical methods in this context.

A further part considers bootstrap methods, which in the seminal paper of Bradley Efron 1979 have been introduced for independent and identically distributed random variables, for dependent observations. Starting with regression-type and residual based bootstrap methods we will deal with the autoregressive sieve-bootstrap, the moving block bootstrap, the dependent wild bootstrap and the subsampling.

A final part is devoted to bootstrap methods for time series in frequency domain. It will be clearly explained, what are the advantages of periodogram-based bootstrap methods and what are the limitations. If time permits frequency domain bootstrap methods for locally stationary time series will be presented as well.

Course material will be distributed during the lecture series.

Registration: Please register via email to Diana Sieber (dsieber@gwdg.de) asap.

The principal investigators of RTG 2088 invite you to participate.