



High Dimensional
Nonstationary Time Series



IRTG 1792 Short Course

Wolfgang Polonik

Statistical Topological Data Analysis

This course will present an introduction to the topic of statistical topological data analysis (TDA), which enjoys a recent steep increase in popularity, in particular in many areas of application, including genetics, cosmology, computer graphics, robotics, and many more. Basic concepts underlying TDA will be introduced and discussed. This includes the notion of persistent homology, Vietoris-Rips and Čech complexes, barcodes, and the persistence diagram. Then we address statistical approaches that use persistence diagrams constructed from observed data, to extract information about certain topological and geometric aspects of the space from which the data were sampled.

Familiarity with basic notions of algebraic topology is helpful, but not necessary.



Wolfgang Polonik is a professor at the Department of Statistics, University of California, Davis. He received his Ph.D. degree from Ruprecht-Karls-Universität Heidelberg in 1992. His areas of interest cover Non-parametric Statistics, Shape constraints, modality, Non-stationary Time series and Empirical process theory. Currently, he is specialized in Topological Data Analysis.

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