Nonparametric time series analysis

Cees Diks

Pisa, St. Anna School, October 2006

Topics covered

• Motivation and background; measures of complexity from chaos theory: Takens’ reconstruction theorem, correlation integrals, fractal dimensions, correlation entropy, estimation of dynamic invariants, local linear prediction

• Nonparametric tests based on correlation integrals: Divergences between reconstruction measures, U-statistics estimators, tests for symmetry of multivariate distributions, attractor comparison, testing for reversibility, tests for serial independence and linearity

• Statistical aspects of nonparametric tests: asymptotic results for U-statistics in time series context, bootstrap and Monte Carlo tests, consistency, bandwidth selection problem, diagnostic model checking, nuisance parameters, tests based on empirical copulas

• Granger causality tests: conditional independence, linear versus nonlinear Granger causality, nonparametric Granger causality tests, testing for Granger causality using correlation integrals, consistency, local measures of conditional dependence

Relevant reading

Background


Tests for serial independence, linearity, etc.


Granger causality


