

Title: Methods for periodic and irregular time series

Author: Mgr. Tomáš Hanzák

Department: Department of Probability and Mathematical Statistics

Supervisor: Prof. RNDr. Tomáš Cipra, DrSc.

Abstract: The thesis primarily deals with modifications of exponential smoothing type methods for univariate time series with periodicity and/or certain types of irregularities. A modified Holt method for irregular times series robust to the problem of "time-close" observations is suggested. The general concept of seasonality modeling is introduced into Holt-Winters method including a linear interpolation of seasonal indices and usage of trigonometric functions as special cases (the both methods are applicable for irregular observations). The DLS estimation of linear trend with seasonal dummies is investigated and compared with the additive Holt-Winters method. An autocorrelated term is introduced as an additional component in the time series decomposition. The suggested methods are compared with the classical ones using real data examples and/or simulation studies.

Keywords: Discounted Least Squares, Exponential smoothing, Holt-Winters method, Irregular observations, Time series periodicity