Title: Robust Monitoring Procedures for Dependent Data

Author: Ondřej Chochola

Department: Department of Probability and Mathematical Statistics

Supervisor: Prof. RNDr. Marie Hušková, DrSc.

Supervisor's e-mail address: `huskova@karlin.mff.cuni.cz`

Abstract: In the thesis we focus on sequential monitoring procedures. We extend some known results towards more robust methods. The robustness of the procedures with respect to outliers and heavy-tailed observations is introduced via use of M-estimation instead of classical least squares estimation. Another extension is towards dependent and multivariate data. It is assumed that the observations are weakly dependent, more specifically they fulfil strong mixing condition.

For several models, the appropriate test statistics are proposed and their asymptotic properties are studied both under the null hypothesis of no change as well as under the alternatives, in order to derive proper critical values and show consistency of the tests. We also introduce retrospective change-point procedures, that allow one to verify in a robust way the stability of the historical data, which is needed for the sequential monitoring.

Finite sample properties of the tests need to be also examined. This is done in a simulation study and by application on some real data in the capital asset pricing model.

Keywords: Robust monitoring, Change-point detection, M-estimates, Weak dependence, Capital asset pricing model