

Einladung
zum
1. Biometrischen Seminar im SS 2009
am
Donnerstag, den 12.03.2009 um 15.00 Uhr c.t.
im Seminarraum 07,
Erdgeschoss des Schwackhöferhauses,
Peter Jordanstraße 82, 1190 Wien.

Vortragender: **Dr. Peter Ruckdeschel, Fraunhofer ITWM,**
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Thema: **Robustness Issues in Kalman Filtering Revisited**

Zusammenfassung:

We will report on some recent progress made in robustness for Kalman filtering. To this end, we introduce the general setup of state space models which will not be limited to a Euclidean or time-discrete framework. We pose the problem of state reconstruction and repeat the classical existing algorithms in this context. We then extend the ideal-model setup allowing for outliers which in this context may be system-endogenous or -exogenous, and which will induce the somewhat conflicting goals of swiftly tracking a deviated signal but simultaneously attenuate the influence of erroneously large observations.

In quite a general framework, we solve a corresponding minimax MSE-problem for the latter type of outliers, resulting in a saddle-point consisting of an optimally-robust procedure and a corresponding least favorable outlier situation. Using particle filter techniques, and still insisting on recursivity, we hope to get an operational solution, but at any rate, will be able to determine the loss in efficiency when restricting attention to Huberized linear filters (i.e., the rLS filter). Preliminary studies indicate that the loss will be smallish. To this end, it is important to quantify the deviation of the exact conditional mean from linearity. Interestingly, we obtain a somewhat surprising characterization of linearity for the conditional expectation in this setting.

Finally, we report on some on-going projects in robustness for Kalman filtering which involve implementation of the procedures to R, bridging over to particle filtering techniques, (hyper-)parameter estimation, and recursive smoothing. In the last context we hope to improve upon the well-known inert reaction of the classical Kalman filter in IO/tracking problems.

Keywords: robustness, Kalman Filter, innovation outlier, additive outlier

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Wien, am 05.03.2009

Ao.Univ.Prof.DI.Dr. Karl MODER eh

Prof. Dr.Dr.h.c. Dieter Rasch eh