Approximate Conditional-mean Type Filtering for State-space Models

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Abstract

We consider in the following the problem of recursive filtering in linear state-space models. The classically optimal Kalman filter (Kalman, 1960; Kalman and Bucy, 1961) is well known to be prone to outliers, so robustness is an issue.

For an implementation in R (R Development Core Team, 2005), the first two authors have been working on an R package `robKalman` (Ruckdeschel and Spangl, 2007), where a general infrastructure is provided for robust recursive filters. In this framework the rLS (Ruckdeschel, 2001) and the ACM (Martin, 1979) filter have already been implemented, the latter as an equivalent realization of the filter implemented in Splus.

While this ACM filter is bound to the univariate setting, based on Masreliez's result (Masreliez, 1975) the first and the third author propose a generalized ACM type filter for multivariate observations (Spangl and Dutter, 2008).

This new filter is implemented in R within the `robKalman` package and has been compared to the rLS filter by extensive simulations.

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