Bias aware Kalman filters - DTU Orbit (20/10/2019)

Bias aware Kalman filters: Comparison and improvements
This paper reviews two different approaches that have been proposed to tackle the problems of model bias with the Kalman filter:
the use of a colored noise model and the implementation of a separate bias filter. Both filters are implemented with and without feedback of the bias into the model state. The colored noise filter formulation is extended to correct both time correlated and uncorrelated model error components. A more stable version of the separate filter without feedback is presented. The filters are implemented in an ensemble framework using Latin hypercube sampling. The techniques are illustrated on a simple one-dimensional groundwater problem. The results show that the presented filters outperform the standard Kalman filter and that the implementations with bias feedback work in more general conditions than the implementations without feedback.

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