



Kalman Filter Constraint Tuning for Turbofan Engine Health Estimation (Paperback)

By -

Bibliogov, United States, 2013. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. Kalman filters are often used to estimate the state variables of a dynamic system. However, in the application of Kalman filters some known signal information is often either ignored or dealt with heuristically. For instance, state variable constraints are often neglected because they do not fit easily into the structure of the Kalman filter. Recently published work has shown a new method for incorporating state variable inequality constraints in the Kalman filter, which has been shown to generally improve the filter's estimation accuracy. However, the incorporation of inequality constraints poses some risk to the estimation accuracy as the Kalman filter is theoretically optimal. This paper proposes a way to tune the filter constraints so that the state estimates follow the unconstrained (theoretically optimal) filter when the confidence in the unconstrained filter is high. When confidence in the unconstrained filter is not so high, then we use our heuristic knowledge to constrain the state estimates. The confidence measure is based on the agreement of measurement residuals with their theoretical values. The algorithm is demonstrated on a linearized simulation of a turbofan engine...



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