



## Constrained Kalman Filtering Via Density Function Truncation for Turbofan Engine Health Estimation

By -

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 30 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. 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 (which may be based on physical considerations) are often neglected because they do not fit easily into the structure of the Kalman filter. This paper develops an analytic method of incorporating state variable inequality constraints in the Kalman filter. The resultant filter truncates the PDF (probability density function) of the Kalman filter estimate at the known constraints and then computes the constrained filter estimate as the mean of the truncated PDF. The incorporation of state variable constraints increases the computational effort of the filter but significantly improves its estimation accuracy. The improvement is demonstrated via simulation results obtained from a turbofan engine model. The turbofan engine model contains 3 state variables, 11 measurements, and 10 component health parameters. It is also shown that the truncated Kalman filter may be a more accurate way of incorporating inequality constraints than other constrained filters. This item...



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