عنوان مقاله:

Nonlinear State Estimation Using Hybrid Robust CubatureKalman Filter

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خلاصه مقاله:

In this paper, a novel filter is provided that estimates the states of any nonlinear system, both in the presence and absence of uncertainty with high accuracy. It is well understood that a robust filter design is a compromise between the robustness and the estimation accuracy. In fact, a robust filter is designed to obtain an accurate and suitable performance in presence of modelling errors. So in the absence of any unknown or time-varying uncertainties, the robust filter does not provide the desired performance. The new method provided in this paper, which is named hybrid robust cubature Kalman filter (CKF), is constructed by combining a traditional CKF and a novel robust CKF. The novel robust CKF is designed by merging a traditional CKF with an uncertainty estimator so that it can provide the desired performance in the presence of uncertainty. Since the presence of uncertainty results in a large innovation value, the hybrid robust CKF adapts itself according to the value of the normalized innovation. The CKF and robust CKF filters are run in parallel and at any time, a suitable decision is taken to choose the estimated state of either the CKF or the robust CKF as the final state estimation. To validate the performance of the proposed filters, two examples are given that demonstrate their promising performance

کلمات کلیدی:

Uncertainty; State Estimation; Cubature Kalman Filter (CKF); Robust CKF; Hybrid Robust CKF

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