

Poster Session (P)

Poster Lunch (1)

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ADAPTIVE MULTIPLE FADING FACTORS THREE-STAGE KALMAN FILTER FOR STATE AND FAULT ESTIMATION OF LINEAR SYSTEMS WITH UNKNOWN INPUTS

Abstract

To simultaneously estimate the state and fault of linear stochastic discrete-time system models with unknown inputs, the optimal three-stage Kalman filter (OThSKF) and robust three-stage Kalman filter (RThSKF) are presented. But for the general system models with incomplete models of fault and unknown inputs, especially with multiple state variables, these methods may not be useful. What is worse, these methods have many conditions on matrices ranks. Those will seriously affect their application in engineering. As a result, an adaptive multiple fading factors three-stage Kalman filter (AMThSKF) is proposed with the observation matrix in a special form. Furthermore, as to the observation matrix with a general form in most engineering practices, the corresponding AMThSKF, which has been extended to the observation matrix with the general form, is presented. Illustrative examples in two situations are given to apply the proposed filter and the performances of the filter are verified by simulations.