Abstract

In this paper, an efficient scheme to detect and classify faults in a system using Kalman filtering and hybrid neuro-fuzzy computing techniques, respectively, is proposed. A fault is detected whenever the moving average of the Kalman filter residual exceeds a threshold value. The fault classification has been made effective by implementing a hybrid neuro-fuzzy Inference system. By doing so, the critical information about the presence or absence of a fault is gained in the shortest possible time, with not only confirmation of the findings but also an accurate unfolding-in-time of the finer details of the fault, thus completing the overall fault diagnosis picture of the system under test. The proposed scheme is evaluated extensively on a two-tank process used in industry exemplified by a benchmarked laboratory scale coupled-tank system.

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