다변량 통계분석을 통한 새로운 모델 수정 방법

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Multivariate statistical process control (MSPC) techniques have been successfully used in modeling of chemical processes for monitoring and diagnosis. In case of a model that requires higher monitoring resolution, the model should be frequently updated to reflect process changes when an operating mode changes. However, if it carries out blind model update without detecting either mode change or disturbance, the models will adapt to disturbance. This paper proposes a novel model updating procedure improving the monitoring performance by (i) detecting of process changes and isolation of disturbances, and (ii) adapting the model to the changed operating mode using flexible forgetting factor. After detecting the different operating mode, steady-state data are collected for new modeling and then remodeling is performed by using the cumulative data. The proposed approach has been applied to industrial fired heater. The proposed approach is compared with the previous approaches such as static Principal Component Analysis (PCA) and recursive PCA to demonstrate the improved monitoring performance. Case studies show that this approach is more robustly updated to the operating changes by isolating disturbances. Besides, it reduces the false alarms in comparison with the previous works.