

Data-based analysis methods received an increasing attention for fault detection (FD) and diagnosis in large-scale and complex systems so as to improve the overall operation by detecting when abnormal system operations exist and diagnosing their sources. Common methods based on multivariate statistical analysis (MSA) are widely used and particularly principal component analysis (PCA). Fault detection indices used along with PCA including the Hotelling T^2 statistic and the squared prediction error (SPE) known as the Q statistic can be used to identify faults. However in industrial applications, process data is noisy in general with imprecise measurements and errors, in addition to the fact that acquired data doesn't follow particular patterns and thus doesn't have an exact representation. As a direct drawback, MSA methods and their extensions fail to achieve their desired outcomes due to data defections causing inaccurate features extraction and erroneous monitoring. Meanwhile these methods have their performance controlled through fixed control limits, which also control the degree of trade-off between robustness and detection sensitivity and thus produce a large amount of false alarms and missed detections, and consequently compromise the reliability of the process monitoring scheme. These shortcomings form the basic motivation of this work to develop an adaptive threshold algorithm to be integrated with MSA methods to overcome their limitations towards a more reliable and widespread applications