Abstract :

Principal component analysis (PCA) is well-known as a multivariate statistical analysis method, it has been widely and effectively applied for process monitoring. Furthermore, dynamic PCA (DPCA) methods consider serial correlation in addition to cross correlation between variables, and thus reflects the process dynamics. In this paper, we investigate static and dynamic monitoring, where different DPCA methods are used with uniform and different numbers of lags for each variable. Moreover, resulting statistics of these modelling methods are evaluated though our developed adaptive threshold, aimed at improving the monitoring scheme's robustness and sensitivity. Those constructed schemes are tested and evaluated though the eminent Tennessee Eastman Process (TEP) benchmark. The obtained results demonstrate superior performance and promising capabilities of some detection schemes.