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Combined use of principal component analysis and self organization map for condition monitoring in pickling process

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Abstract: Process monitoring using multivariate statistical process control (MSPC) has attracted large industries types due to its practical importance and application. In this paper, a combined use of principal component analysis (PCA) and self organization map (SOM) algorithms are considered. Habitually PCA method uses T2 Hoteling's and squared predicted error (SPE) as indexes to classify processes variability. In this paper, new version of indexes called metric distances obtained from the self organization map (SOM) algorithm replace the conventional indexes proper to PCA. A comparative study between SOM, the conventional PCA and the hybrid form of PCA–SOM is examined. Application is made on the real data obtained from a pickling process. As shown in different figures, the combined approach remains important comparatively to PCA but not more than SOM.

Keywords : component analysis, Condition monitoring