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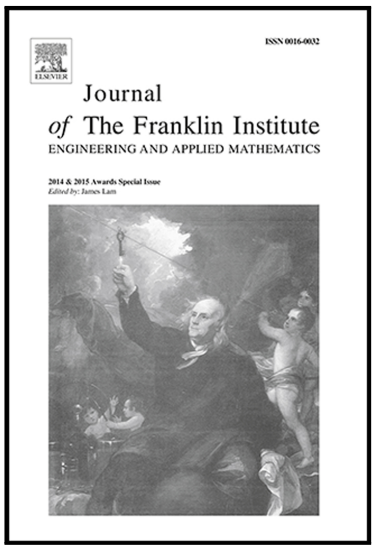

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Multi-subspace Factor Analysis Integrated with Support Vector Data Description for Multimode Process Monitoring

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Abstract

In modern plant-wide systems, chemical industry processes are usually equipped with multiple operating modes to meet the requirements of diversification products. Accurately identifying the running-on mode therefore becomes a focal point. Meanwhile, systems produce numerous process variables, along with complex relationships, which may deteriorate the effectiveness with which statistical processes are monitored. To solve this problem, this study proposes a multimode factor analysis (FA) method that integrates Pearson's correlation coefficient, joint probability, and support vector data description (SVDD). First, subspaces are generated automatically by using Pearson's coefficients of correlation among variables, instead of based on prior knowledge, which is not always available. Second, the statistical indices are derived by the FA models constructed in each subspace

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