

Process Data-Driven Representation of Abnormalities for Efficient Process Control

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Abstract : Unexpected operational events or abnormalities of industrial processes have a serious impact on the quality of final product of interest. In terms of statistical process control, fault detection and diagnosis of processes is one of the essential tasks needed to run the process safely. In this work, nonlinear representation of process measurement data is presented and evaluated using a simulation process. The effect of using different representation methods on the diagnosis performance is tested in terms of computational efficiency and data handling. The results have shown that the nonlinear representation technique produced more reliable diagnosis results and outperforms linear methods. The use of data filtering step improved computational speed and diagnosis performance for test data sets. The presented scheme is different from existing ones in that it attempts to extract the fault pattern in the reduced space, not in the original process variable space. Thus this scheme helps to reduce the sensitivity of empirical models to noise.

Keywords : fault diagnosis, nonlinear technique, process data, reduced spaces

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