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数据库、信号与信息处理

基于MSPCA的传感器故障诊断与数据重构

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摘要 讨论了基于多尺度主元分析的故障传感器数据重构问题。传统的多尺度主元分析方法没有建立故障传感器数据重构模型，在相关传感器信号的所有尺度上建立主元分析模型进行传感器故障诊断的基础上，将主元分析模型的重构结果组合后进行小波逆变换，设计了能够实现故障传感器数据重构的多尺度主元分析模型，从而实现故障传感器的数据重构。最后，利用试车台液氢供应系统的传感器数据仿真了几种典型传感器故障，并对设计模型实现数据重构的实用性和有效性进行了验证。

关键词 多尺度主元分析 故障传感器 数据重构
分类号

Sensor fault diagnosis and data reconstruction based MSPCA

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Abstract
Multi-Scale Principal Component Analysis for data reconstruction of the faulty sensor is discussed.Conventional MSPCA did not establish the model for data reconstruction of the faulty sensor.So，the PCA modals were established at each scale for sensor fault diagnosis with the principle of MSCPA in this paper.Then，the MSPCA model is established for data reconstruction of the faulty sensor together with PCA and reverse wavelet transformation.The application modal in real time is designed by moving window，and the drifting failure and the cyclic failure are simulated.Finally，several sensor fault modes are simulated with the sensor data of the ground testing bed hydrogen providing system.And the applicability and effectiveness of the proposed modal is illustrated by these modes.

Key words Multi-Scale Principal Component Analysis（MSPCA） faulty sensor data reconstruction

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