自动化学报 (): ISSN: 0254-4156 CN: 11-2109/TP

[2010-0071]基于差分分段PCA的多模态过程故障监测

谭帅,王福利,常玉清,王姝, 周贺

收稿日期 修回日期 网络版发布日期 2010-6-24 接受日期

摘要
多模态的故障监测是一个复杂的问题，既需要考虑稳定模态下的故障监测， 也需要考虑不同模态间的过渡故障监测。不同稳定模态下的数据具有不同的相关关系， 对每个稳定模态需要建立不同的稳定模态模型。当稳定生产模态发生改变时，生产过程进入过渡模态， 需要考虑过渡变量相关关系的变化。本文通过对过渡数据差分，得到变量相对变化信息。用PCA分段对差分变量的相关特性进行分析， 提取相对变化的特征。最后以实际连续退火机组生产线为背景，用基于差分分段PCA的多模态方法对多模态过程进行故障监测， 发现算法很好的反映了实际过渡过程机理，验证了算法的有效性。

关键词 差分矩阵,分段建模,多模态,故障监测,连续退火机组
分类号

Fault Detection of Multi-mode Process Using Segmented PCA Based on Differential Transform

TAN Shuai, WANG Fu-Li, CHANG Yu-Qing, WANG Shu, ZHOU He

Abstract
Fault detection for multi-model is a complicated problem, as the fault detection for both steady mode and transition mode should be taken into consideration. Different modes are need for different steady modes because different relations of variables are contained in each mode model. Transition mode is a dynamic process occuring when production changes operate mode. The dynamic characteristic reflects on not only the changing variables but also the changing relation of variables. The relative change information can be obtained by differential transform of transition data. Principle components can be extracted by analysing correlation of differential variables using PCA. At last, segmented modeling with PCA method is applied to monitor multi-mode process of continuous annealing line. The algorithm reflects transition process well and is proved to be efficient.

Key words difference matrix segmented modeling multi-mode fault detection continuous annealing line
DOI:

通讯作者
作者个人主页 谭帅;王福利;常玉清;王姝; 周贺