

过程系统工程

一种新的多工况过程在线监测方法

葛志强, 宋执环

工业控制技术国家重点实验室, 浙江大学工业控制研究所

收稿日期 2007-1-19 修回日期 2007-5-9 网络版发布日期 2008-1-14 接受日期

摘要

针对复杂工业过程中的多工况和非高斯信息问题, 提出一种基于外部分析的ICA-PCA (independent component analysis and principal component analysis) 在线统计监测新方法。首先把过程变量分为外部变量和主要变量, 通过偏最小二乘 (PLS) 回归方法分离外部变量对主要变量的影响, 然后利用ICA-PCA两步信息提取策略, 完整地提取过程的信息, 最后用3个统计量对过程进行监测, 建立了一种具有非高斯特性的多工况过程在线监测算法。通过对一个数值例子和连续搅拌槽 (CSTR) 过程的仿真研究, 说明提出的方法是可行、有效的。

关键词

[多工况](#) [非高斯](#) [外部分析](#) [ICA-PCA](#) [PLS](#)

分类号

New online monitoring method for multiple operating modes process

GE Zhiqiang, SONG Zhihuan

Abstract

In order to handle the multiple operating modes problem and the widely existing non-Gaussian information of industrial processes, a new online process monitoring method was proposed, which was based on external analysis and independent component analysis and principal component analysis (ICA-PCA). First, process variables were divided into two parts: external variables and main variables, and partial least square (PLS) was used to remove the influence of external variables on main variables. Then a two-step information extraction method ICA-PCA was used to extract the process information completely. Finally, three statistics were built to monitor the process. An online algorithm was also developed. Simulations of a linear system and CSTR process showed the feasibility and effectiveness of the new method.

Key words

[multiple modes](#) [non-Gaussian](#) [external analysis](#) [ICA-PCA](#) [PLS](#)

DOI:

通讯作者 宋执环 zhong@iipc.zju.edu.cn

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(512KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“多工况”的 相关文章](#)
- ▶ [本文作者相关文章](#)

- [葛志强](#)
- [宋执环](#)