

过程系统工程

## 基于混合差分进化算法的软测量时延参数估计

王钧炎, 黄德先

清华大学自动化系, 北京 100084

收稿日期 2008-1-17 修回日期 2008-3-10 网络版发布日期 2008-8-11 接受日期

摘要

时延参数估计是系统控制与信号处理的关键问题。通过构造一个适当的适应度函数, 将软测量系统的时延参数估计问题转化为一个多维非线性优化问题, 然后利用混合差分进化算法的全局搜索能力求解该优化问题。对两个典型问题进行了仿真实验, 仿真结果表明了混合算法的有效性和鲁棒性。以石油炼制工业中典型装置常压塔为例, 对其一线航空煤油的闪点软测量进行了应用验证, 结果表明, 时延参数估计的引入大大提高了软测量模型的精度, 证实了混合差分进化算法的有效性。

关键词

[混合差分进化](#) [软测量模型](#) [时延估计](#) [偏最小二乘](#)

分类号

## Time delay estimation of soft-sensor model based on hybrid differential evolution algorithm

WANG Junyan, HUANG Dexian

### Abstract

Time delay estimation is one of the most important issues in system control and signal processing. Through establishing an appropriate fitness function, the time delay estimation of soft-sensor model could be formulated as a multi-dimension nonlinear functional optimization problem, which could be solved by hybrid differential evolution (HDE) algorithm. Numerical simulation results on two benchmarks demonstrated the effectiveness and robustness of HDE. Taking a crude atmospheric distillation unit in oil refinery as an example, a numerical application of the soft-sensor model for the kerosene flash point was made. The application results demonstrated that the accuracy of soft-sensor model was greatly improved with the introduction of time delay estimation. Besides, the effectiveness of the proposed HDE was confirmed.

### Key words

[hybrid differential evolution algorithm](#) [soft-sensor model](#) [time delay estimation](#) [partial least-squares](#)

DOI:

通讯作者 王钧炎 [wangjunyan02@mails.tsinghua.edu.cn](mailto:wangjunyan02@mails.tsinghua.edu.cn)

### 扩展功能

#### 本文信息

▶ [Supporting info](#)

▶ [PDF\(1236KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [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“](#)

[混合差分进化”的 相关文章](#)

▶ [本文作者相关文章](#)

· [王钧炎](#)

· [黄德先](#)