

多相流

多传感器数据融合在气固流化床流型识别中的应用

王晓萍, 林萍, 黄轶伦, 陈伯川

浙江大学光电系;仪器系;化学工程与生物工程学系, 浙江 杭州 310027

收稿日期 2003-6-20 修回日期 2003-9-28 网络版发布日期 2008-9-1 接受日期

摘要 在模糊集理论的基础上给出了多传感器信息融合的一般化办法, 并将这种办法用于气固流化床流型的识别中. 以压差、压力信号的算法复杂性 $C(n)$ 、涨落复杂性 Cf 作为特征参数, 根据特征参数建立了单个传感器判别流型的隶属度函数. 对多个传感器的识别结果进行数据融合, 最后得到了多传感器对不同流型的识别结果. 实验结果表明, 应用多参数、多传感器数据融合能得到较好的识别结果.

关键词 [复杂性](#) [模糊理论](#) [多传感器融合](#) [流型](#) [隶属度函数](#)

分类号

MULTI-SENSOR DATA FUSION IN IDENTIFYING DIFFERENT FLOW REGIMES IN GAS-SOLID FLUIDIZED BED

WANG Xiaoping, LIN Ping, HUANG Yilun, CHEN Bochuan

Abstract

Flow regime identification of gas-solid fluidized bed has been a difficult problem in fluidized field. Up to now, it is almost impossible to recognize all the flow regimes with a single sensor or parameter because of the inner complexity of the pressure signal of gas-solid phase system and the existence of transition. A new regime-division method is proposed in this paper. Fuzzy language "membership" is used to describe the degree of transition. Algorithmic complexity $C(n)$ and fluctuation complexity Cf of the pressure signal of a separate sensor are used as nonlinear characteristic parameters to indicate the flow regimes. Simplified models of $C(n)$ and Cf to identify the flow regimes are established according to observation and statistics of experiments. Membership functions are given to indicate the flow regimes according to the simplified models. Data fusion at the feature level is carried out through fuzzy transformation and the identification result of a separate sensor is obtained. Data fusion at the decision level is carried out in the same way and the initial identification results are input into the decision center as local decisions. Finally the identification result of multi-parameters and multi-sensors is obtained. The experimental results show that multi-sensor data fusion can well identify the fluidized states.

Key words [complexity](#) [fuzzy theory](#) [multi-sensor data fusion](#) [fluidized regime](#) [membership function](#)

DOI:

通讯作者 王晓萍 xpwang@zjuem.zju.edu.cn

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(1148KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [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“复杂性”的 相关文章](#)
- ▶ [本文作者相关文章](#)

- [王晓萍](#)
- [林萍](#)
- [黄轶伦](#)
- [陈伯川](#)