

过程系统工程

基于ART-SVR的过程建模及在干点软测量中的应用

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摘要

针对石油化工生产过程通常呈高度非线性, 且生产过程数据呈非连续、具有一定类别特性等特征, 提出基于自适应谐振神经网络 (adaptive resonance theory, ART) 和支持向量回归 (support vector regression, SVR) 相结合的建模方法 (ART-SVR)。首先, 基于建模样本, 通过ART将样本模式空间分割成若干模式特性相近的子空间; 然后, 对各子空间分别采用SVR建立各自模型, 实现基于样本模式空间分割的“分段”建模。仿真试验和在石脑油干点软测量建模的实际应用表明: ART-SVR模型的拟合精度和预测精度均优于全局SVR模型。

关键词

[自适应谐振神经网络](#) [支持向量回归](#) [建模](#) [干点](#) [软测量](#)

分类号

Process modeling based on ART-SVR and its application in dry point soft measurement

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Abstract

The petrochemical process is highly nonlinear and the observation data of the petrochemical process are non-continuous and have classified characteristics. A novel process modeling method, which combined adaptive resonance theory (ART) with support vector regression (SVR), was proposed. Firstly, ART was used to separate the input pattern space into several sub-spaces based on a modeling sample. Then, SVR was used to build up each sub-model for each sub-space. The results of simulation experiment and an application in dry point soft measurement of naphtha showed that ART-SVR could reduce the nonlinear degree of the sub-models and its fitting accuracy and prediction accuracy were both better than those of a single SVR model.

Key words

[adaptive resonance neural networks](#) [support vector regression](#) [modeling](#) [dry point](#) [soft measurement](#)

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