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论文

基于径基函数-加权偏最小二乘回归的干点软测量

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摘要
针对影响石油馏分产品干点因素众多且呈高度非线性的特征，提出了一种径基函数(Radial basis function，RBF)和加权偏最小二乘回归(Weighted partial least squares regression，WPLSR)相结合的建模方法建立干点软测量模型. 该组合方法首先应用RBF 实现样本数据的非线性变换；然后根据非线性变换后样本在结构参数空间中的分布，分析它们对预测对象的预报能力，自适应地为各个样本分配权值，并进而从中提取和选用PLS 成分，实施加权PLSR，以获得预报性能良好的模型. 在实际应用于初顶石脑油干点软测量建模中，RBF-WPLSR 获得比PLSR、WPLSR 及RBF-PLSR 更高精度的模型.

关键词 径基函数 加权 偏最小二乘回归 干点

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Radial Basis Function-weighted Partial Least Square Regression and Its Application to Develop Dry Point Soft Sensor

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Abstract
A novel approach of integrating the radical basis function (RBF) with weighted partial least squares regression(WPLSR) has proposed to develop the dry point sensor in petroleum distillation products. Many operation factors have effect on the dry point products and correlation among them. Firstly, this approach uses RBF to carry out the nonlinear transformation for the sample data. Secondly, the space distribution a of a nonlinear transformation sample data set is analyzed, and each nonlinear transformation sample is self-adaptively weighted according to its different ratios of predicting contribution for the predicting sample. Thirdly, PLSR is applied to weighted nonlinear transformation sample data set to remove the correlation and develop a model with high predicting precision. Finally, PLSR, WPLSR, RBF-PLSR and RBF-WPLSR are utilized to develop the naphtha dry point soft sensor. The comparison results show that the prediction by RBF-WPLSR is the most precise.

Key words Radial Basis Function Weighted Partial Least Square Regression Dry Point

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