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RESEARCH NOTES

基于多尺度分析与主元分析的聚丙烯熔融指数神经元软测量预报模型

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摘要 Prediction of melt index（MI）, the most important parameter in determining the product' s grade and quality control of polypropylene produced in practical industrial processes, is studied. A novel soft-sensor model with principal component analysis（PCA）, radial basis function（RBF）networks, and multi-scale analysis（MSA）is proposed to infer the MI of manufactured products from real process variables, where PCA is carried out to select the most relevant process features and to eliminate the correlations of the input variables, MSA is introduced to a-quire much more information and to reduce the uncertainty of the system, and RBF networks are used to characterize the nonlinearity of the process. The research results show that the proposed method provides promising prediction reliability and accuracy, and supposed to have extensive application prospects in propylene polymerization processes.

关键词 聚丙烯生产, 工业分析, 测量模型, 神经元网络, 多尺度分析, 主成分分析.

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Melt Index Prediction by Neural Soft-Sensor Based on Multi-Scale Analysis and Principal Component Analysis

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Abstract Prediction of melt index（MI）, the most important parameter in determining the product' s grade and quality control of polypropylene produced in practical industrial processes, is studied. A novel soft-sensor model with principal component analysis（PCA）, radial basis function（RBF）networks, and multi-scale analysis（MSA）is proposed to infer the MI of manufactured products from real process variables, where PCA is carried out to select the most relevant process features and to eliminate the correlations of the input variables, MSA is introduced to a-quire much more information and to reduce the uncertainty of the system, and RBF networks are used to characterize the nonlinearity of the process. The research results show that the proposed method provides promising prediction reliability and accuracy, and supposed to have extensive application prospects in propylene polymerization processes.

Key words propylene polymerization; neural soft-sensor; principal component analysis; multi-scale analysis.

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