■ 论文摘要

基于多Agent及多方法集成的复杂工艺优化模型

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摘　　要：针对复杂工艺中涉及多因子、高噪声、非线性过程关系和模糊对象问题，提出一种集成多种智能计算方法的优化模型。该模型以多Agent技术来组织，划分为决策支持层、系统重构层和数据集成层，Agent间以Ontology 来实现信息传递。在建模过程中，利用Chebyshev多项式的正交性质和递推性质，将过程输入变量正交化、线性化后，再应用偏最小二乘回归法计算模型参数，优化Agent在交互方式下通过变异的遗传算法来获取模糊工艺的最优解。以MOLDFLOW软件获取的注塑数据来训练BP(Back propagation)神经网络。结果表明：该优化系统的平均预测精度较BP神经网络提高3.23%。

关键字：多代理系统；偏最小二乘法回归；遗传算法；工艺优化

Complex process optimal model based on multi-agent and multi-method integration

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Abstract: In order to optimize the complex process involving multi-factor, high noise, non-linear relationship between the process of process and fuzzy objects, an intelligent optimal model which integrates a variety of calculating methods was proposed. The model based on multi-Agent technology was divided into layers, the system reconfiguration layer and data integration layer. The communication between the Agents of this model was realized by Ontology. In modeling, the model parameters were calculated by using Chebyshev polynomials orthogonal and partial least-squares regression method. In the interactive mode, the fuzzy optimal solution was calculated by the optimization Agent using the improved genetic algorithm. BP (Back propagation) neural network was trained by injection data obtained from MOLDFLOW software. The results show that the average prediction accuracy of this system increases by 3.23%, compared with that of BP neural network.

Key words: multi- Agent system (MAS); partial least squares regression; genetic algorithm; process optimization