

过程系统工程

注塑机工艺参数的智能设置与优化

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摘要

针对工艺人员的试模思路, 混合使用实例推理、代理模型和模糊推理技术, 建立一种描述注塑机工艺参数设置与优化全过程的混合智能模型。首先采用实例推理技术模拟工艺人员设置初始工艺参数时的“借鉴”思维, 在实例推理失败的情况下, 采用代理模型模拟工艺人员的“直觉”思维设置初始工艺参数, 然后将初始参数用于试模, 最后利用模糊推理技术实现工艺人员不断修正缺陷、优化工艺参数的思维过程。基于上述智能模型开发出了相应的软件系统, 并通过与控制器的通讯实现与注塑机的集成, 实际案例验证表明该系统正确有效, 可应用于实际生产。

关键词

[注射成型](#) [实例推理](#) [代理模型](#) [模糊推理](#) [注塑机](#) [工艺参数优化](#)

分类号

Intelligent setting and optimization of process parameters for injection molding machine

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Abstract

Based on the molding operator's thought during the molding trial-runs, a hybrid intelligent model employing case-based reasoning, surrogate model and fuzzy inference was constructed. First, the idea of case-based reasoning was adopted for the initial process parameters setting, which simulated the molding operator's behavior that one often recalls previous cases and sets the initial process parameters of the current one by referring to the previous ones. If the case-based reasoning failed to set the initial process parameters, a surrogate model was applied to determine the initial process parameters, which imitated a skilled operator's "know-how" and intuitive sense acquired through long-term experience. Then, the molding trial would be run on the molding machine. Finally, a fuzzy inference based on expert knowledge was developed for correcting defects and optimizing process parameters during the molding trial run until the part quality was found satisfactory. A corresponding intelligent system was developed to be integrated with injection machine by communicating with the controller, and experimental studies showed that the intelligent system could be used in a shop-floor production environment.

Key words

[injection molding](#) [case-based reasoning](#) [surrogate model](#) [fuzzy inference](#) [injection molding machine](#) [process parameters optimization](#)

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