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复杂工业系统的广义知识模型与智能建模

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摘 要: 分析了复杂工业系统与传统系统的不同, 指出了复杂工业系统广义知识模型与智能建模的必要性和紧迫性; 研究了复杂工业系统的现场数据检测与信息融合、建模、控制、管理与决策及运行状态等特征, 提出了实现复杂工业系统的广义知识模型描述、模型化原则, 并从数值模型描述、符号(语言)模型描述、人类专家自然语言符号描述3个方面, 给出了多层智能建模的具体方法和策略; 介绍了多种智能技术在广义知识模型和智能建模中的应用, 研究了复杂工业系统的多层广义知识描述与智能建模方法的综合应用以及复杂工业过程的智能协调控制系统结构。

关键字: 复杂工业系统; 知识模型; 智能建模

Research on generalized knowledge model and intelligent modeling for complex industrial process

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Abstract: Complex industrial process plants and traditional plants were analysed. The need and pressure of generalized knowledge representation model were pointed out. Real-time data detecting and information fusion, modeling and control, management and decision, and operating process of complex industrial process plants were researched. A generalized knowledge representation model and principles of the model were presented. From numerical, language and human expert nature sign of model representation, the method and strategy of multilayer intelligent modeling were discussed in detail. The application of several intelligent technologies to the generalized knowledge representation model and intelligent modeling, multilayer generalized knowledge representation and intelligent modeling and intelligent harmony control structure of complex industrial process were all described. The results show that the strategy, method and technology mentioned in this paper can be applied to CIPS and integrate automation of power system effectively.

Key words: complex industrial system; knowledge model; intelligent modeling

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