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智能诊断的定量推理机制和最优推理环境

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QUANTITATIVE REASONING MECHANISM AND OPTIMUM REASONING ENVIRONMENTS IN INTELLIGENT DIAGNOSIS

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摘要 描述和分析了一种新的基于智能信息处理的故障检诊方法，可以处理复杂动态系统故障检诊面临的复杂故障组合模式和时间特性。从推理机制的量化和推理环境的优选两方面完善了该理论，使其诊断能力、实时性和适用范围都得到提高。推理机制的量化是通过引入概率信息实现的。考虑到诊断过程中可能出现新的故障。又进一步引入了候选项集合扩张机制描述该现象，并提供了相关的概率计算公式。推理机制定量化使得诊断结果可以精确度量，检诊过程也可精确控制。推理环境优选则是通过引入熵信息实现的，由此提高了诊断效率。

关键词： 故障诊断　定量推理　人工智能

Abstract： A new diagnosis method based on intelligent information processing is described and analyzed, which can deal with complicated combination patterns and temporal characteristics of the faults in complex dynamic systems. By quantifying the reasoning mechanism and optimizing the reasoning environments, it is improved further in diagnosis capability, real time performance and application scope. The reasoning mechanism is quantified by introducing information of probability. Because here a more practical assumption is used that new faults can take place during the diagnosis process, a new mechanism called' candidates extending' is introduced to describe this phenomenon, and some formulae are provided for probability evaluation. By quantifying the reasoning mechanism, the diagnosis results can be measured quantiatively and the diagnosis process can be controlled accurately. Optimizing the reasoning environments is realized by introducing information of entropy, which can improve diagnosis effectiveness greatly.

Keywords： fault diagnosis　quantiative reasoning　a rtificial intelligence

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