

博士论坛

基于广义随机Petri网的CIMS多任务可靠性研究

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摘要 CIMS生产的复杂性要求其可靠性模型可以精确地反映生产过程, 由于传统的可靠性建模方法无法兼顾CIMS的时间动态特性, 所以针对一个复杂的有多个加工任务的CIMS制造单元, 由于其机器加工工件的时间均为指数分布, 则采用广义随机Petri网进行多任务可靠性建模, 在此基础上基于Petri网行为表达式, 将矩母函数思想引入其中, 不必生成可达标识图就可通过计算模型的传递函数, 进而得到整个系统的多任务可靠度, 该可靠性指标可以更直观地反映具有多种加工任务的整个CIMS的运行性能。

关键词 [CIMS可靠性建模](#) [多任务可靠度](#) [广义随机Petri网](#) [行为表达式](#)

分类号

Analysis of multitask reliability for CIMS based on generalized stochastic petri nets

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Abstract

Owing to the complexity of CIMS' missions, the reliability modeling should adapt the production processes accurately. Conventional reliability model method can not reflect the time dynamic behavior of CIMS, so the multitask reliability model based on generalized stochastic Petri nets (GSPN) is established for a CIMS manufacturing shop with multiple missions and the process times of the machines with exponential distributions. Furthermore, analysis of GSPN model based on behavior expression and moment generating function is presented, then can compute the transfer functions. Finally, the multitask reliability can be easily obtained without the reachability graph of Petri nets, which measure can reflect the operating performance of the whole multitask CIMS more intuitively.

Key words [CIMS reliability modeling](#) [multitask reliability](#) [generalized stochastic petri nets](#) [behavior expression](#)

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