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异构网络化汽车电子系统中多DAG离线任务调度

Multiple DAG off-line task scheduling for heterogeneous networked automobile electronic systems

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英文关键词: [heterogeneous networked automotive electronic systems](#) [multiple DAG](#) [communication overhead](#) [schedule length](#) [real-time](#)

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中文摘要:

公平性和通信开销已成为影响调度性能的主要瓶颈, 首先在任务优先级排序阶段, 提出基于通信开销值的轮转调度的公平排序标准; 在处理器选择阶段, 提出在插入法的基础上将任务分配到具有最小选择值的选择标准; 综合上述2个阶段, 提出以降低调度长度和减少通信开销为目标的多DAG离线公平任务调度(MDOFTS, multiple DAGs off-line and fairness task scheduling)算法。异构网络化汽车电子系统是一个典型的混合关键级嵌入式系统, 既要确保实时性又要降低调度长度, 提出了以满足安全关键DAG的多DAG离线优先级任务调度(MDOPTS, multiple DAGs off-line and Priority task scheduling)算法。综合MDOFTS和MDOPTS, 提出多DAG离线自适应任务调度(MDOATS, multiple DAGs off-line and adaptive task scheduling)算法, 在满足实时性的基础上提高调度性能。实例分析和实验结果表明, 提出的算法在调度长度、通信开销、不公平性、最差响应时间和实时性上都优于其他算法。

英文摘要:

Fairness and communication overhead have become the major bottleneck in performance of scheduling, a fair sorting criteria based on round-robin with communication overhead weight was proposed and a selection criteria based on assigning the task to the minimum selection value considering insertion was proposed in processor selection phase. The multiple DAG off-line and fairness task scheduling (MDOFTS) algorithm was proposed combining the above two phases to reduce the schedule length and communication overhead. Heterogeneous networked automobile electronic systems are typical mixed-criticality embedded systems, which must make sure to be real-time and to reduce scheduling length. The multiple DAG off-line and priority task scheduling (MDOPTS) algorithm was proposed to make sure the safety-critical DAG. The multiple DAG off-line and adaptive task scheduling (MDOATS) algorithm was proposed to improve the system performance on the basis of real-time based on MDOFTS and MDOPTS. Example analysis and experimental results show that the MDOFTS algorithm is better than other algorithms in schedule length, communication overhead, unfairness, worst-case response time and real-time.

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