

工程与应用

## 基于模糊逻辑的能量觉察反馈调度

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收稿日期 2008-9-8 修回日期 2009-9-11 网络版发布日期 2010-3-2 接受日期

**摘要** 嵌入式系统的节能问题是系统设计中的热点。在保证系统整体控制性能的前提下达到尽可能低的能耗,一直是嵌入式控制系统中能量管理的目标。由于诸多不确定性因素和负载的动态变化,嵌入式系统总是运行在不可预期的开放环境中。为了有效处理CPU负载变化及控制任务执行时间不确定等问题,提出了一种基于模糊逻辑的能量觉察反馈调度方法。反馈调度器动态调节CPU的处理速度,实现对CPU利用率的有效控制,从而提供了一种有效的能量管理机制。通过仿真实验与常规动态电压调整方法、传统方法以及理想情况进行比较,验证了该反馈调度方法的有效性。

**关键词** [能量觉察](#) [模糊逻辑](#) [反馈调度](#) [动态电压调整](#)

**分类号** [TP302](#)

## Fuzzy logic based feedback scheduling for power-aware systems

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### Abstract

Energy conservation is an important issue for embedded systems' design. Using energy consumption as low as possible to obtain the overall system's quality of control is always an objective of energy management in embedded control system. Due to the dynamic changes of some uncertainties and workload, the embedded systems usually run in unexpected open environments. In order to effectively deal with the change of CPU workload and uncertain execution time of the control tasks, a feedback scheduling technique based on fuzzy logic for power-aware systems is designed. The feedback scheduler, which adjusts the CPU processing speed dynamically and controls the CPU utilization effectively, provides an effective method for energy management mechanism. The simulation results highlight that the proposed scheduling technique is an effective method in comparison with general Dynamic Voltage Scaling (DVS) technique, traditional scheduling technique and ideal case.

**Key words** [power-aware](#) [fuzzy logic](#) [feedback scheduling](#) [Dynamic Voltage Scaling \(DVS\)](#)

DOI: 10.3778/j.issn.1002-8331.2010.07.071

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