

Abstract

In the last years real-time systems have incorporated new characteristics and, consequently, they have been more demanded in terms of processing capacity. Some of these systems are put to operate in conditions where the energy supply is restricted or, still, came from batteries. Unfortunately, the advance of the technology of batteries has been slow in following the increasing necessities of consumption. Thus, two options are left: the use of bigger batteries or a more efficient energy management. As the physical increase of the battery is not always possible nor desirable, techniques of energy management that lead to a smaller consumption become an important project requirement for these systems.

This dissertation presents methods to be used with together a rate monotonic scheduler for power saving in real-time systems, through the use of dynamic voltage scaling. All the proposed methods use an off-line and an on-line phase. The off-line phase calculates the smaller frequency that still guarantees all timing constraints. The on-line phase takes into account the additional time produced by tasks that run for less than their worst-case execution time, and also the slack left in the first phase, to yet reduce the frequency of execution. Through simulation, some experiments had been realized that demonstrate significant reduction in power consumption.