MINIMIZING SERVICE DELAY OF APERIODIC TASKS 
IN DYNAMIC-PRIORITY NON-PREEMPTIVE HARD 
REAL-TIME SYSTEMS 

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ABSTRACT 

A scheduling technique is presented to minimize service delay of aperiodic tasks in hard real-time systems that employ dynamic-priority scheduling and do not allow task preemption. In a real-time scheduling process, the execution of periodic tasks can be deferred as long as this does not cause other tasks to violate their time constraints. However, aperiodic tasks that usually have urgent missions should complete execution as early as possible. In this paper, it is assumed that aperiodic tasks also have time constraints. Thus, the problem of deciding whether an aperiodic task with an unpredictable arrival time can be scheduled successfully or not is difficult to solve because delaying periodic tasks may cause them to fail to meet their time constraints. We present a dynamic scheduling technique to solve this problem which makes use of the symmetric property of a schedule. The maximum possible idle slot is always reserved at every scheduling point so that aperiodic tasks can be serviced immediately if the reserved idle slot is big enough to service them. The proposed technique also maximizes utilization of idle slots by reserving them for the longest possible time span. 

KeyWords: Scheduling, non-preemptive, periodic, aperiodic, service delay.