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## Towards Fully Jitterless Applications: Periodic Scheduling in Multiprocessor MCSs Using a Table-Driven Approach

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### Abstract

In mixed criticality systems (MCSs), the time-triggered scheduling approach focuses on a special case of safety-critical embedded applications which run in a time-triggered environment. Sometimes, for these types of MCSs, perfectly periodical (i.e., jitterless) scheduling for certain critical tasks is needed. In this paper, we propose FENP\_MC (Fixed Execution Non-Preemptive Mixed Criticality), a real-time, table-driven, non-preemptive scheduling method specifically adapted to mixed criticality systems which guarantees jitterless execution in a mixed criticality time-triggered environment. We also provide a multiprocessor version, namely, P\_FENP\_MC (Partitioned Fixed Execution Non-Preemptive Mixed Criticality), using a partitioning heuristic. Feasibility tests are proposed for both uniprocessor and homogenous multiprocessor systems. An analysis of the algorithm performance is presented in terms of success ratio and scheduling jitter by comparing it against a time-triggered and an event-driven method in a non-preemptive context.

### Keywords

**Author Keywords:** real-time scheduling; non-preemptive scheduling; mixed criticality systems; jitter; embedded systems

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