Poster

Scheduling Parallel Real-Time Tasks In Multiprocessor Platforms

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Abstract
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Multiprocessor Systems

- Computing systems are gradually becoming **multiprocessor**
- **Opportunity** for an increase in application performance, throughput and responsiveness
- **Real-time systems** may take advantage of platform parallelism to distribute workload among the cores for simultaneous execution

Proposed Solutions

Response time analysis for the synchronous task model

Semi-Partitioned Scheduling of Fork-Join Tasks using Work-Stealing

Results

230% improvement over SOA

Gain achieved in average response-time when combining work-stealing with semi-partitioned scheduling

Problems Addressed

- **Problem of scheduling parallel real-time tasks in multiprocessor systems**
  - Intra-task parallelism vs. Inter-task parallelism
- **Problem of resource sharing in multiprocessor systems**
  - Cores are not independent entities, they share resources such as memory buses, memory controllers and last level caches
  - Schedulability may be jeopardized when two or more applications access shared resources simultaneously

Schedulability Analysis for Global Fixed-Priority Scheduling of the 3-Phase Task Model

13% improvement over SOA