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Poster

Scheduling Parallel Real-Time Tasks in Multiprocessor Platforms

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CISTER-TR-180410

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Abstract

Scheduling Parallel Real-Time Tasks in Multiprocessor Platforms

CISTER - Research Center in
Real-Time & Embedded Computing Systems

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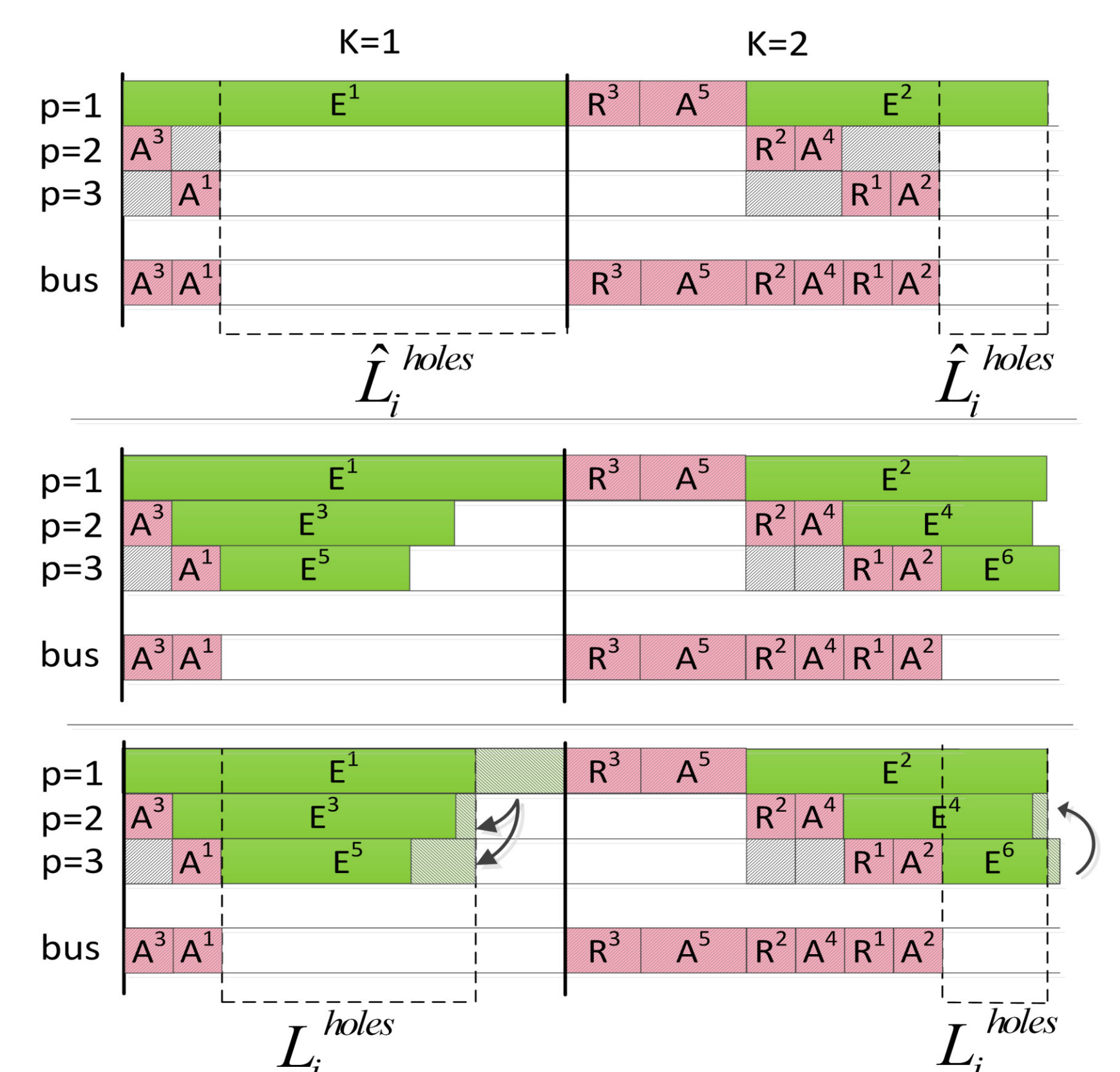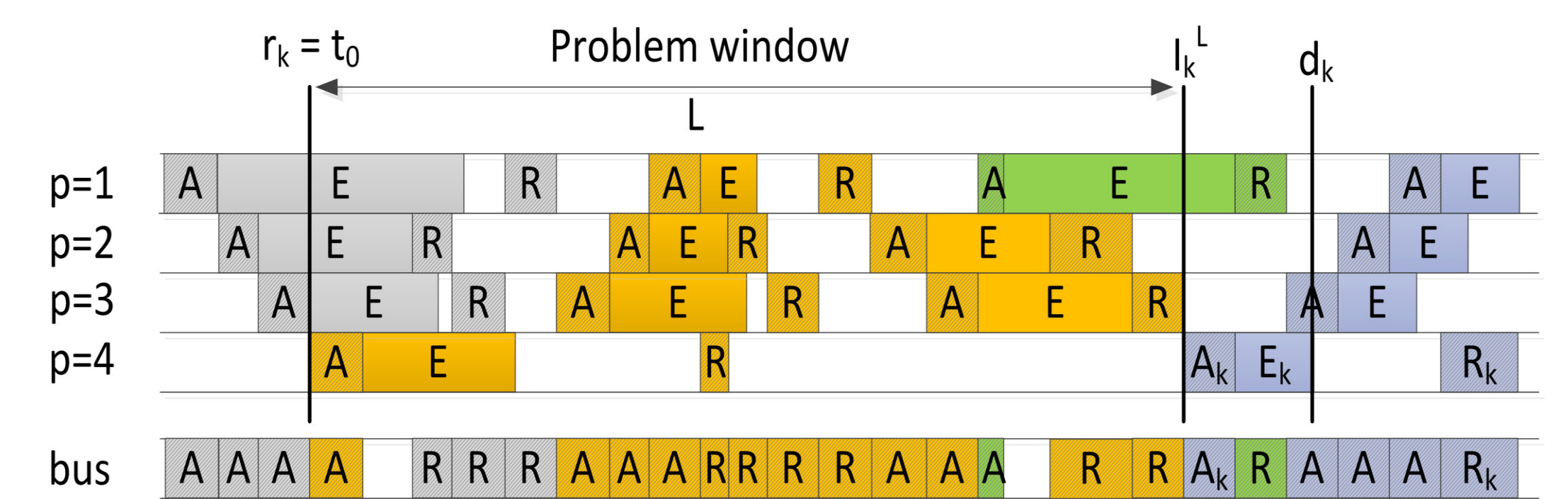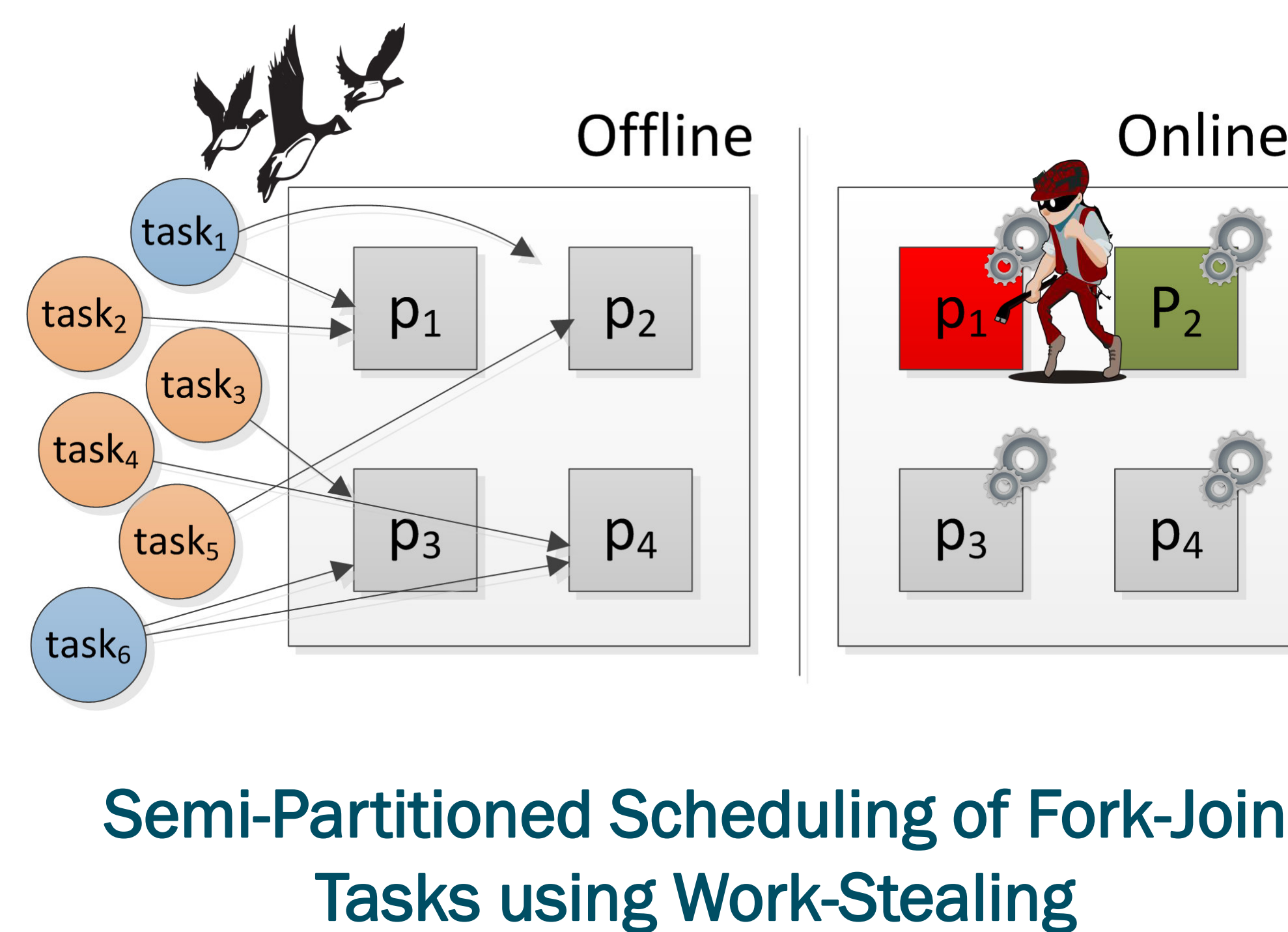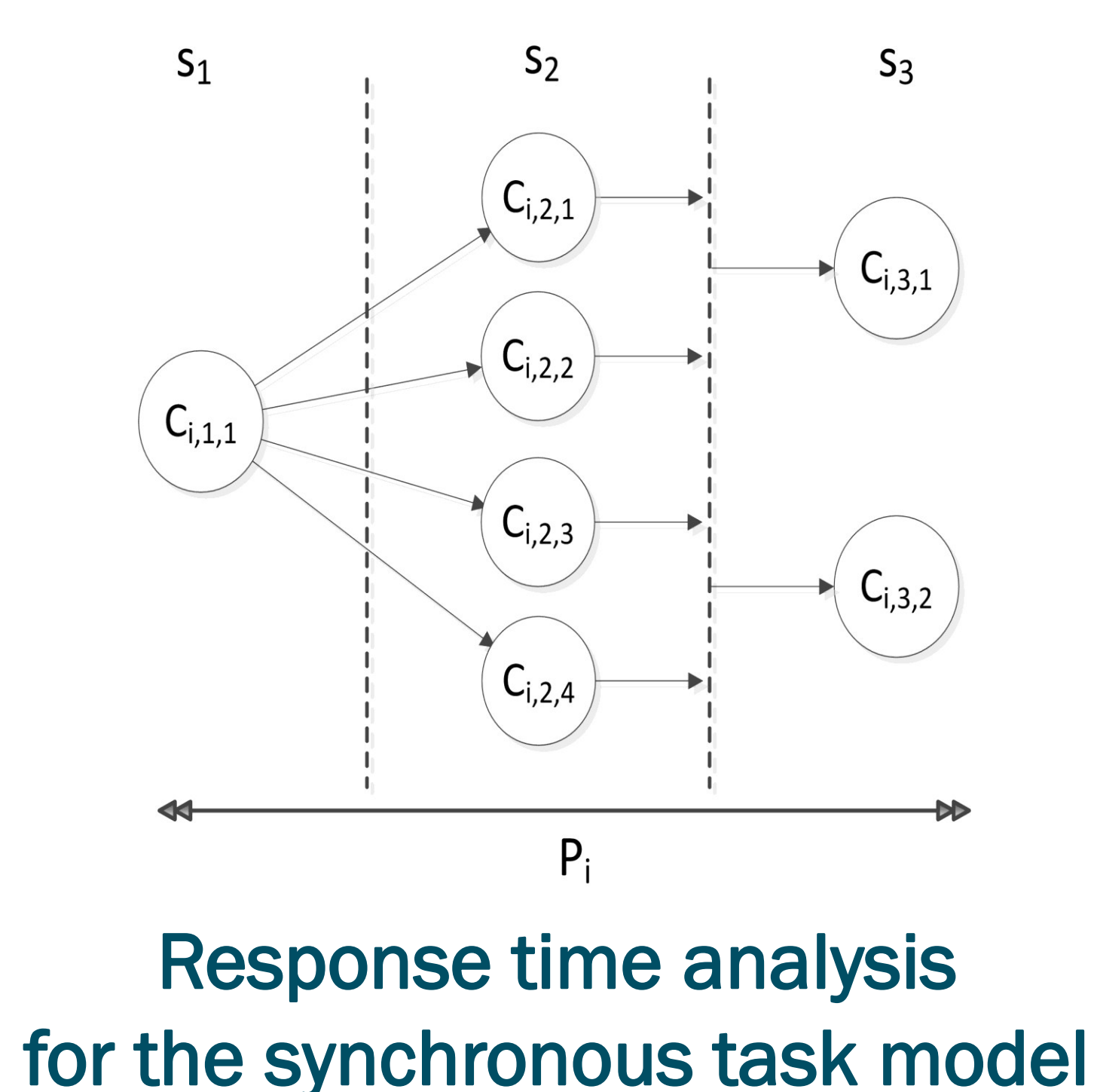
Multiprocessor Systems

- 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
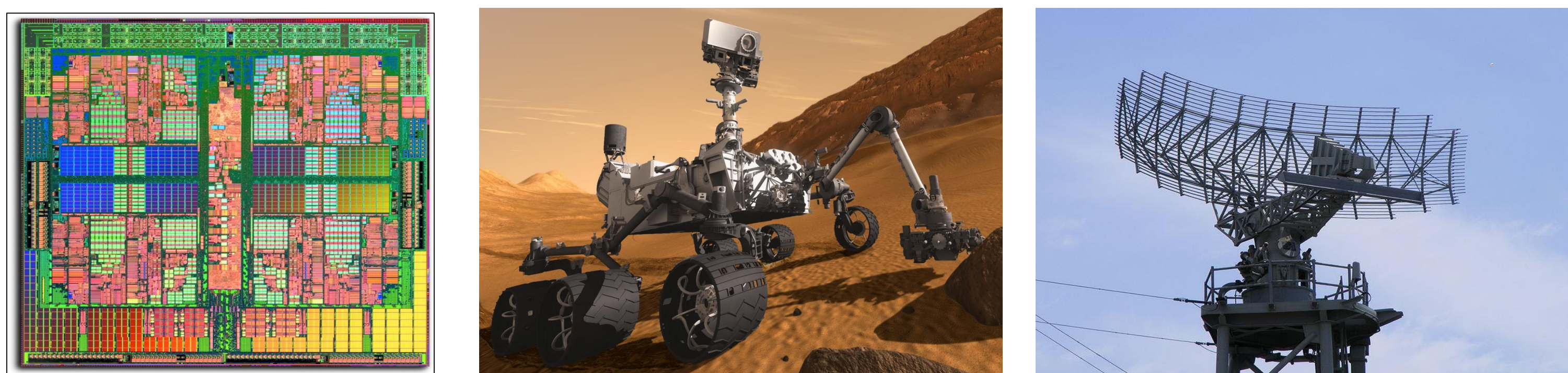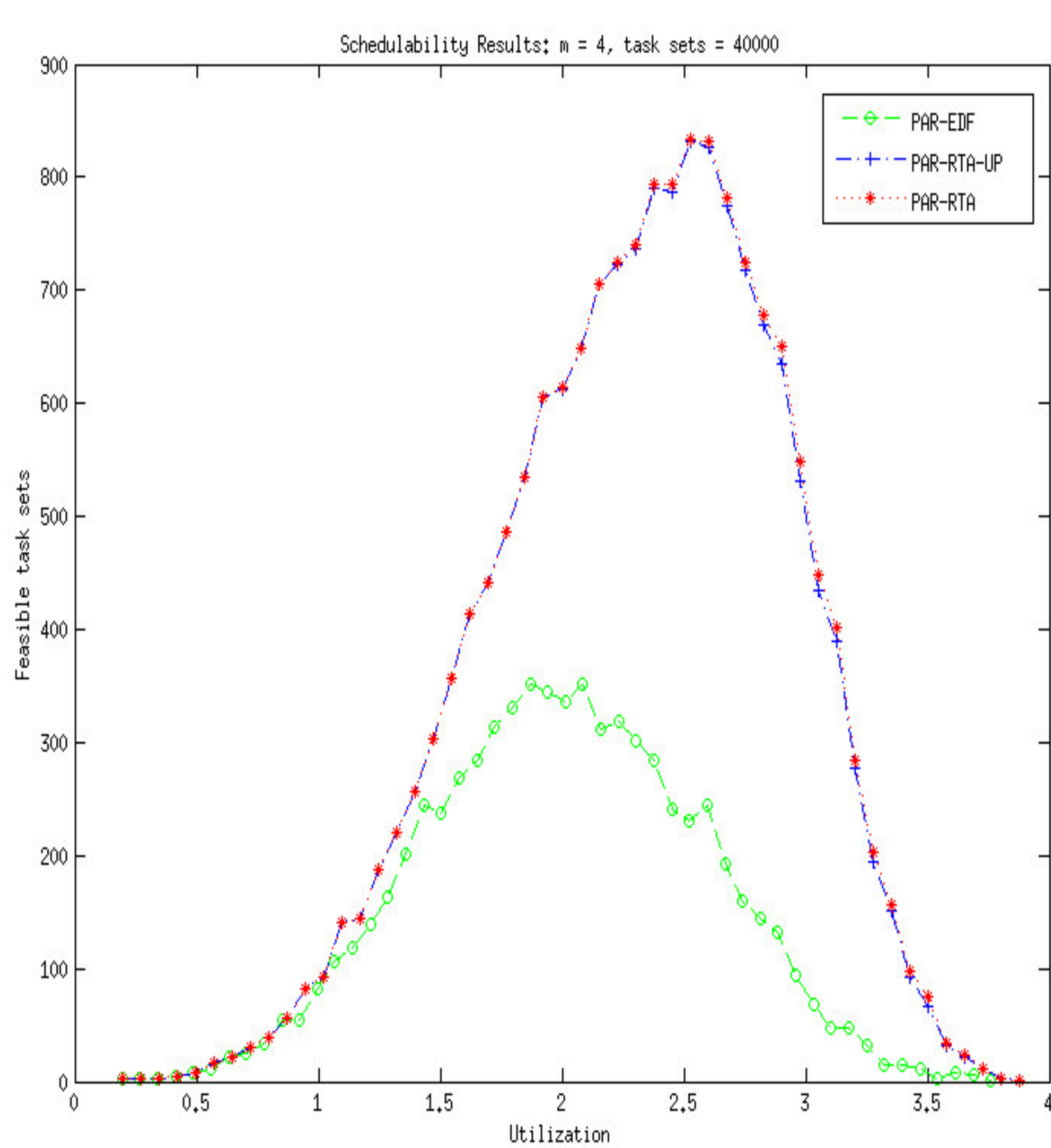
Problems Addressed

- 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
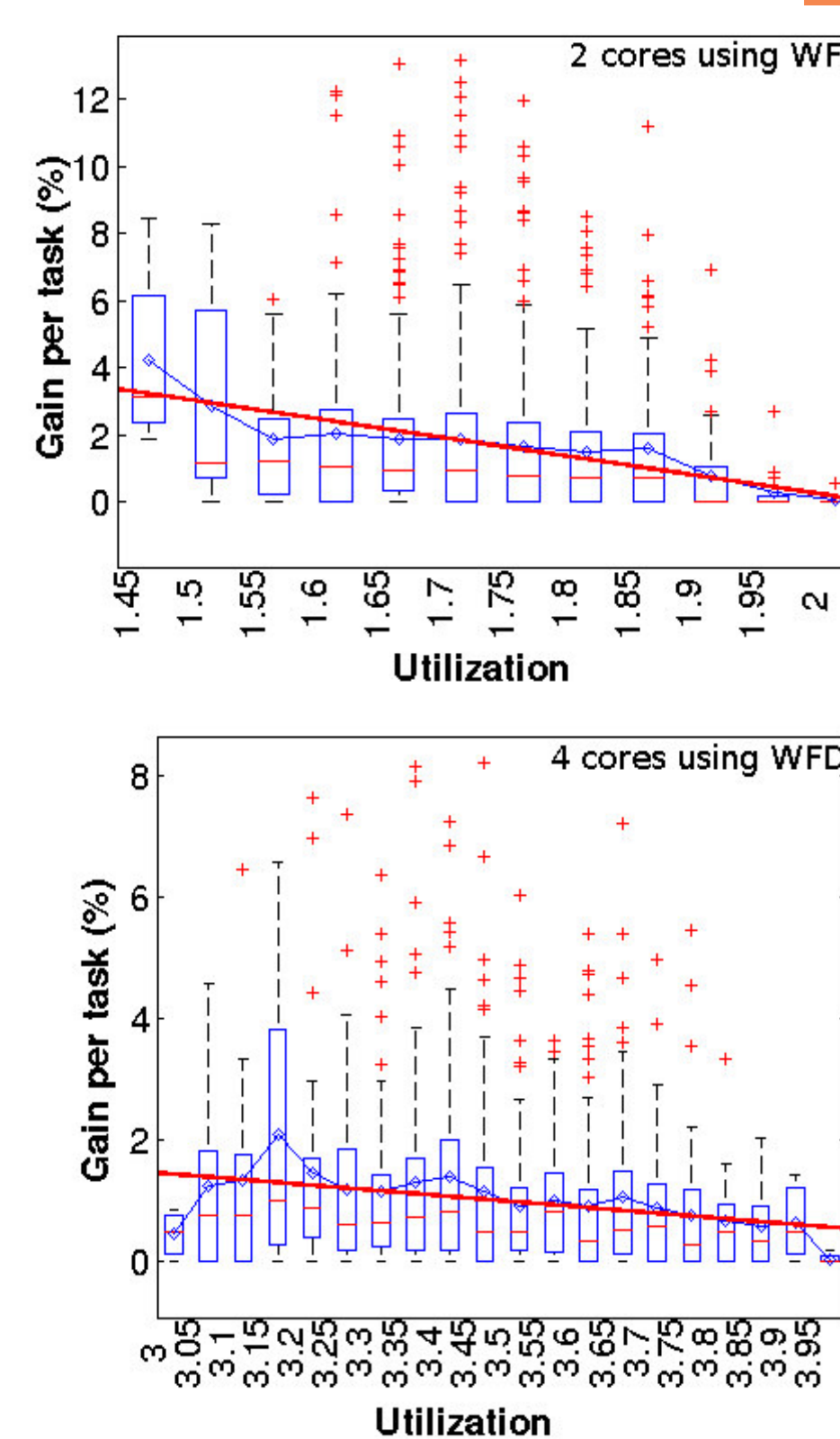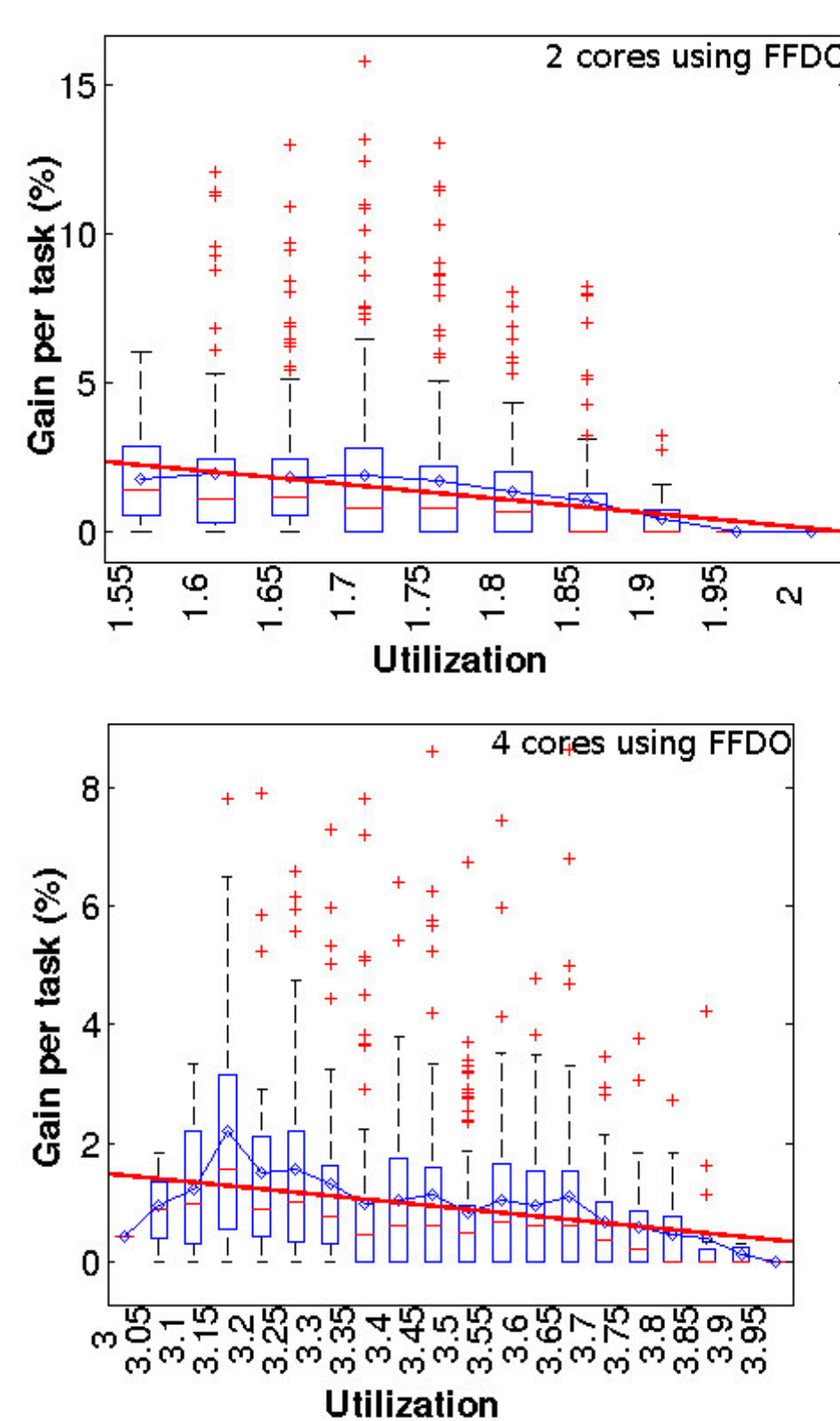 - Schedulability may be jeopardized when two or more applications access shared resources simultaneously
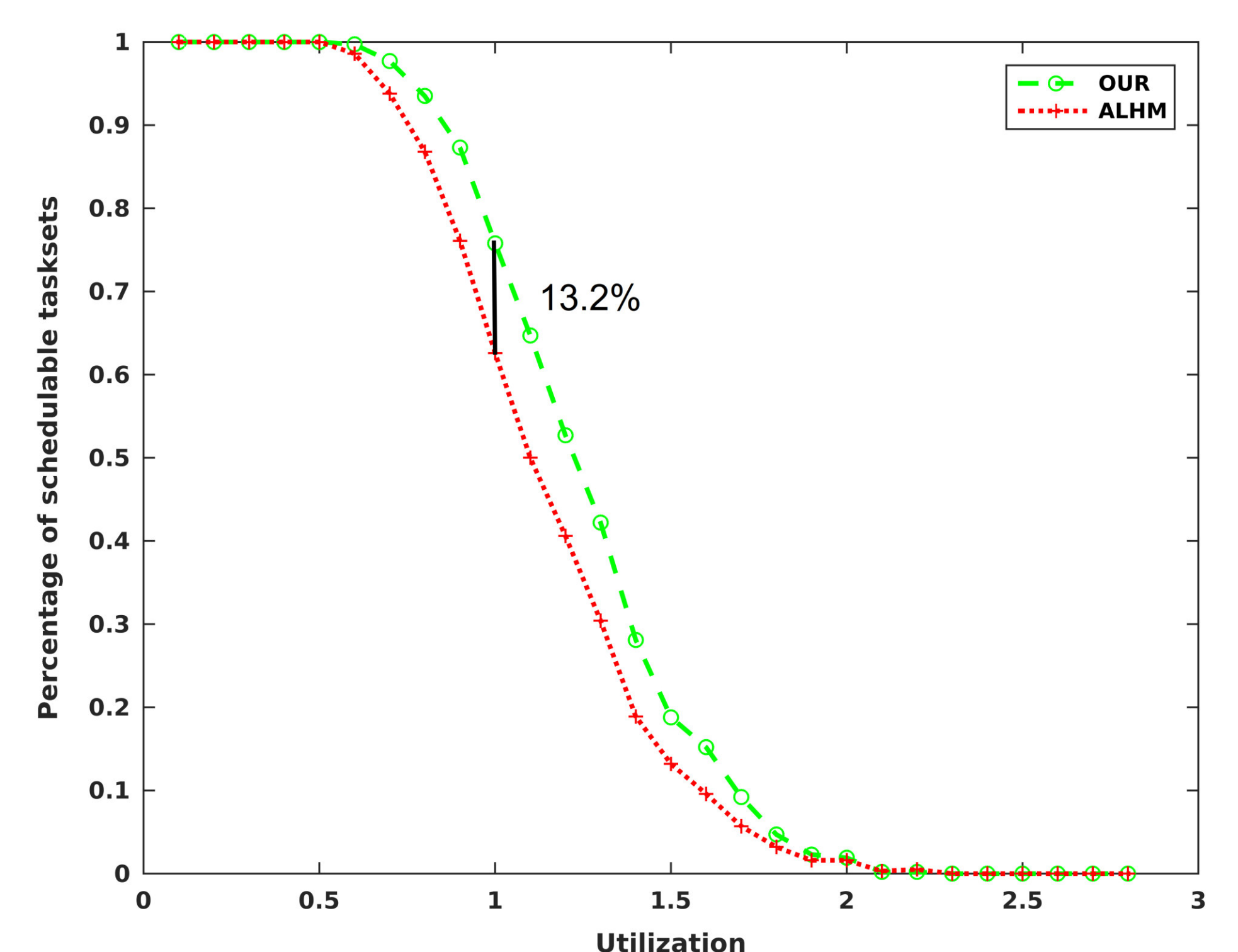
Proposed Solutions

Response time analysis
for the synchronous task model

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

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

Results

230% improvement over SOA

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

13% improvement over SOA

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