Exploiting Harmonic Periods to Improve Linearly Approximated Response-time Upper Bounds
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Motivation and Problem

- Exact FPPS-based schedulability tests are pseudo-polynomial in complexity.
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We propose to

1. improve this test for task sets with harmonically related task periods;
2. apply this test to the EDP-model in hierarchically scheduled systems.
Linearly Computed Response-time Upper Bounds

The existing approach works as follows:

1. A (linear) approximation of the interference of each higher priority task, $\tau_i$, is derived;
2. these linear approximations are summed up and the computation time of the task itself is added;
3. the intersection of the resulting equation with the processor supply is calculated.

![Graph showing linear approximations and processor supply](image)
Combine the workload of higher priority, harmonic tasks into one artificial task:

\[ \tau_{1+2} \]

\[ \tau_3 \]

\[ y = t \]

Davis and Burns’ approach versus our approach
Conclusions and Future Work

- Improved response-time bounds for partially harmonic task sets.

- Extension to hierarchical FPPS:
  - model the unavailability an EDP-resource by two highest priority, harmonic (fictive) tasks.
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Open endings:

1. Extend our analysis for tasks with activation jitter;
2. Compare our approach with utilization-based schedulability tests;
3. Exploit harmonic periods to efficiently calculate EDP budget parameters.