

Algorithms for sporadic task systems

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Main contributions - 1

Feasibility tests for sporadic and periodic task systems:

- Feasibility test for sporadic task systems multiprocessors with speed 2
- Hardness results for periodic task systems
- Polynomial time feasibility test for sporadic task systems harmonic periods (EDF & fixed priority)
- Feasibility test for sporadic multiprocessors

Papers:

- Algorithmica 2012 (2 papers),
- Real time systems 2010,
- ACM Trans. on algorithms 2012,
- RTSS 2013
- Collaborations: S.Baruah, S.Stiller, N.Megow, A.Wiese, H.Chan

More recently

More complex task models

- Mixed criticality
- DAG models

More realistic models of computing platforms

- Multicore platforms
- Heterogenous platforms

Main contributions – Mixed criticality

Mixed criticality: sporadic task systems with two or more criticality levels

- Results: algorithms and feasibility tests for mixed criticality set of jobs and sporadic task systems (one machine)

Papers

- IEEE Trans. on Computers 2012
- J ACM 2015 (include 4 conference papers)
- Collaborations: S.Baruah, N.Megow, L.Stougie, H.Li,S.van der Ster

Main contributions – DAG model

DAG model: a generalized parallel task model where a task is modeled by a Directed Acyclic Graph

- Results: analysis of a model in which each recurrent task is modeled by a DAG of jobs (including conditional DAGs)
- Results: for DAG tasks we have essentially the same results that we have for simple tasks
- Extension to conditional DAG (including if-then-else statements)

Papers:

- RTSS 2012, ECRTS 2013, ECRTS 2015 (2 papers), IEEE Trans on Comp. 2017 (2 papers)
- Collaborations: S.Baruah, L.Stougie, A.Wiese, S.Stiller, M.Bertogna, A.Melani, G.Buttazzo

Main contributions – Heterogenous platforms

Heterogenous platforms: feasibility test of partitioned algorithms on a heterogenous platform for sporadic tasks systems

- Results: feasibility tests for sporadic task systems on a non homogenous computing platform: Techniques ILP models

Papers:

- ICALP 2014
- Math. Programming 2015
- ECRTS 2016 (2 papers)
- Collaborations: S.Baruah, A.Wiese, R.Bruni, S.van der Ster

Multicore platforms

Models that consider

1. cost of memory access in memory hierarchy
talk by Vincenzo - tomorrow
2. affinity masks (ECRTS 2016)
3. What next: extend 1 & 2 above and study more realistic models

Conclusions

- The group has a strong algorithmic expertise in scheduling
- We are **VERY MUCH interested in new cooperations** for new challenging problems
- Do not hesitate to contact us, thanks
 - Vincenzo Bonifaci
 - Gianlorenzo D'Angelo
 - Alberto Marchetti Spaccamela