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## A hybrid algorithm for task scheduling on heterogeneous multiprocessor embedded systems

By: Dr. Golnaz Taheri  
IPM

### Abstract

Most of the scheduling algorithms proposed for real-time embedded systems, with energy constraints, try to reduce power consumption. However, reducing the power consumption may decrease the computation speed and impact the makespan. Therefore, for real-time embedded systems, makespan and power consumption need to be considered simultaneously. Since task scheduling is an NP-hard problem, most of the proposed scheduling algorithms are not able to find the multi-objective optimal solution. In this paper, we propose a two-phase hybrid task scheduling algorithm based on decomposition of the input task graph, by applying spectral partitioning. The proposed algorithm, called G-SP, assigns each part of the task graph to a low power processor in order to minimize power consumption. Through experiments, we compare the makespan and power consumption of the G-SP against well-known algorithms of this area for a large set of randomly generated and real-world task graphs with different characteristics. The obtained results show that the G-SP outperforms other algorithms in both metrics, under various conditions, involving different numbers of processors and considering several system configurations.

### Biography

*Golnaz Taheri is a post-doc researcher in the School of Computer Science, Institute for Research in Fundamental Sciences (IPM). She received her Ph.D. in Computer Science (High-Performance Computing) from the School of Computer Science, IPM in 2019. She also, received her MS and BS degrees in Computer Sciences from University of Tehran and Sharif University of Technology, respectively. Her research interests are Performance Evaluation, Task Scheduling, Embedded Systems Design, and Machine Learning.*