

## COMPUTER SCIENCE SEMINAR SERIES

Department of Computer Science  
City University of Hong Kong

### Min-Energy Scheduling for Aligned Jobs in Accelerate Model

Mr WU Weiwei  
PhD Student

Department of Computer Science  
Joint Research Supervision Collaboration Scheme

offered by City University of Hong Kong and University of Science and Technology of China

**Date :** 20 October 2009 (Tuesday)

**Time :** 2:00pm - 3:00pm

**Venue** CS Seminar Room, Room Y6405, 6th Floor, Yellow Zone, Academic Building, City University of Hong Kong, Tat Chee Avenue, Kowloon Tong

#### Abstract

Dynamic Voltage Scaling technique provides the capability for processors to adjust the speed and control the energy consumption. We study the pessimistic accelerate model where the acceleration rate of the processor speed is at most  $K$  and jobs cannot be executed during the speed transition period. The objective is to find a min-energy (optimal) schedule that finishes every job within its deadline. The job set we study in this paper is aligned jobs where earlier released jobs have earlier deadlines. We start by investigating a special case where all jobs have common arrival time and design an  $O(n^2)$  algorithm to compute the optimal schedule based on some nice properties of the optimal schedule. Then, we study the general aligned jobs and obtain an  $O(n^2)$  algorithm to compute the optimal schedule by using the algorithm for the common arrival time case as a building block. Because our algorithm relies on the computation of the optimal schedule in the ideal model ( $K=\infty$ ), in order to achieve  $O(n^2)$  complexity, we improve the complexity of computing the optimal schedule in the ideal model for aligned jobs from the currently best known  $O(n^2 \log n)$  to  $O(n^2)$ .

This paper will be presented in The 20th International Symposium on Algorithms and Computation (ISAAC 2009), Hawaii, USA, Dec 16-18, 2009.

Supervisor: Dr LI Minming

Research Interest: Combinatorial optimization, Scheduling, Algorithm analysis

\* \* \* \* \*

All are welcome!

*In case of questions, please contact Dr Li Minming at Tel: 2788 9538, E-mail: [minmli@cs.cityu.edu.hk](mailto:minmli@cs.cityu.edu.hk), or visit the CS Departmental Seminar Web at <http://www.cs.cityu.edu.hk/>.*