June 2011

MADALGO seminars by Alejandro López-Ortiz, University of Waterloo

Efficient scheduling of equal size tasks in multiple machines

Abstract:
Consider the problem of scheduling a set of tasks of length p without preemption on m identical machines with given release and deadline times. We introduce a novel graph representation of this task as a "scheduling graph" and show that there exists a feasible schedule if and only if a certain graph property holds. We then propose a compact representation of the graph and auxiliary data structures to test for said property leading to an algorithm has time complexity $O(\min(1, p/m) * n^2)$.
This improves substantially over the best previously known algorithm with complexity $O(m * n^2)$. Interestingly the algorithm produces a schedule which minimizes both completion time and makespan.

Joint work with Claude-Guy Quimper