

University of Iowa
Seminar Friday April 4, 2008

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Proposed Title and Abstract

Title:
Online Optimization in Routing and Scheduling

Abstract:

An online problem is one that must be “solved” without knowing the future or without having complete information. In this talk, we present updated results we have obtained on online routing and scheduling problems. In particular, we consider first online routing optimization problems where the objective is to minimize the time needed to visit a set of locations under various constraints; the problems are online because the set of locations are revealed incrementally over time. We consider several problems such as (1) the online Traveling Salesman Problem (TSP) with precedence and capacity constraints and (2) the online TSP with m salesmen.

For both problems we propose online algorithms, sometimes with best-possible competitive ratios. We also consider resource augmentation, where we give the online servers additional resources to offset the powerful offline adversary advantage. We derive improved competitive ratios. Finally, we study online algorithms from an asymptotic point of view, and show that, under general stochastic structures for the problem data, unknown and unused by the online player, many of these online algorithms are almost surely asymptotically optimal.

We conclude with open research questions.