

## *Arbeitskreissitzung Metaheuristiken*

Mi, 22.10.2008,  
14.00-18:00 Uhr  
SE 2 / BWZ

14.00 Vortrag von Prof. Jean Francois Cordeau  
HEC Montréal, Canada

### ***Scheduling Technicians and Tasks in a Telecommunications Company***

**Abstract:**

This talk will present a construction heuristic and an adaptive large neighbourhood search heuristic for the technician and task scheduling problem arising in a large telecommunications company. This problem belongs to the class of multi-skill project scheduling problems with hierarchical skill levels. Tasks can be maintenance, installation or construction jobs. Each technician is proficient in a number of skill domains. Tasks vary in difficulty and some require more than one technician. Teams must be organized for each day of the planning horizon and tasks must be scheduled and assigned to the teams. The construction heuristic quickly provides a feasible solution to the problem and is used as an important component in the metaheuristic. It plans one day at a time, using a two-phase approach. In the first phase teams are constructed and a single task is assigned to each of them, while in the second phase more tasks are assigned to the already constructed teams. The adaptive large neighbourhood search heuristic attempts to improve this initial solution by repeatedly destroying and repairing the solution. A solution is destroyed by removing a subset of tasks and it is repaired by reinserting these tasks using the construction heuristic. Results will be reported on data from France Télécom. This work was initiated in the context of the 2007 ROADEF Challenge in which our team tied for second place.

15:00 Uhr Vortrag von Mag. Nolz Pamela  
Universität Wien, Institut für Betriebswirtschaftslehre

### ***Multiobjective Covering Tour Problem for Disaster Relief***

#### **Abstract:**

We aim at optimising actions taken after a natural disaster in a developing country. It is assumed that the infrastructure in the affected region has been destroyed by an earthquake, flood or tsunami.

The problem we treat concerns survival help, which means the supply of food, shelter and medicine to the population living in the affected area, compensating the destroyed facilities. Therefore a covering tour problem has to be faced, that consists of developing a set of vehicle routes with respect to three criteria: (1) a combination of the minisum facility location criterion, which minimizes the sum of distances between all members of a population and their nearest facility, and the maximal covering location criterion, which minimizes the number of population members unable to reach a facility within a predefined maximum distance, (2) a minmax routing criterion, that minimizes the latest arrival time at a customer, and (3) a cost criterion, measured in terms of time.

We developed an IP model for the considered problem and we solved the multiobjective problem by applying the epsilon constraint method. Only small problem instances can be solved to optimality. Therefore we developed a metaheuristic solution approach to generate the Pareto-optimal solutions. The method is based on the Nondominated Sorting Genetic Algorithm II by Deb et al., including a variable neighbourhood search as well as path relinking.

15:45 Uhr Vortrag von DI Bin Hu

Technische Universität Wien, Algorithms and Data Structures Group Institute of  
Computer Graphics and Algorithms

### **Solving the Railway Traveling Salesman Problem via a Transformation into the Classical Traveling Salesman Problem**

#### **Abstract:**

The Railway Traveling Salesman Problem (RTSP) is a practical extension of the classical traveling salesman problem considering a railway network and train schedules. We are given a salesman who has to visit a number of cities to carry out some business. He starts and ends at a specified home city, and the required time for the overall journey, including waiting times, shall be minimized.

We present two transformation schemes to reformulate the RTSP as either a classical asymmetric or symmetric Traveling Salesman Problem (TSP). Using these transformations, established algorithms for solving the TSP can be used to attack the RTSP as well.

Tests using the branch-and-cut TSP solver from the Concorde library show that this transformation is efficient and, thus, is highly competitive compared to so far existing approaches for solving the RTSP directly.