8:00-9:40: IS : Engineering applications of combinatorial optimization
Chairman: András Recski
Organizer: András Recski

César 2

This paper introduces the piece selection problem that arises when streaming layered video content over peer-to-peer networks. The piece selection algorithm decides periodically which pieces to request from other peers (network nodes) for download. The main goal of the piece selection algorithm is to provide the best possible quality for the available bandwidth.
Our recommended solution approaches are related to the typical problems and solutions in the knapsack problem.

One of the roles of Intelligent Transportation Systems (ITS) is to collect and disseminate certain information from different locations of the road network. This information can be related to traffic safety (e.g. dangerous situations on the road), traffic efficiency (e.g. current experienced travel times), or to other information (e.g. parking possibilities) the drivers are interested in. The communication network used for dissemination can be either distributed or centralized or a combination of them. In this paper we focus on optimizing the positions where vehicles along their routes should send query messages in order to collect information about traffic jams. This problem is formulated and solved as an Integer Linear Programming problem. Finally, the numerical results are presented and analyzed.

Additive Approximation for Layer Minimization of Manhattan Switchbox Routing. Dávid Szeszlér.
Switchbox routing is one of the many problems arising in the field of VLSI routing. It requires interconnecting given sets of terminals that are placed on the boundaries of a rectangular circuit board using a 3-dimensional grid in a vertex-disjoint way.
An important special case is the Manhattan Switchbox Routing problem. Here minimizing the number of layers of a routing (that is, the height of the grid) is known to be NP-hard. In this paper we provide a linear time algorithm that solves any such problem on a number of layers that is greater by at most 5 than the optimum.

Given an undirected connected graph G we consider the problem of finding a spanning tree of G with a maximum number of internal (at least-2 degree) vertices.
This problem, called the Maximum Internal Spanning Tree problem, is obviously NP-hard since it generalizes the Hamiltonian Path problem. In this paper we aim at giving a survey on recent results about the Maximum Internal Spanning Tree problem including different approaches such as exact exponential algorithms, fixed parameter tractability, and approximation algorithms. We also consider the problem of finding a large almost q-leaf subtree of the input graph for some fixed q.

8:00-9:40: Metaheuristics 1
Chairman: Said Hamafi

César 3

Cooperative model-based metaheuristics. Leonid Hukamtskij and Sergii Sirenko.
The paper presents a methodology for the construction of cooperative model-based metaheuristics for combinatorial optimization problems. Its distinctive feature is two-level structure. The lower level constitutes of independent model-based algorithms called basic. The higher (guiding) level perform search in the problem models space using individual models provided by basic algorithms. The guiding procedure also implement search experience exchange between basic algorithms. As basic algorithms one can take copies of the algorithms that belong either to the same or to the different model-based methods. Cooperative metaheuristic on the basis of ant colony optimization was developed for study of the approach. Results of computational experiment show the efficacy of the suggested cooperation scheme. Presented framework can serve as a basis for hyper-heuristics development.

A Variable Neighborhood Search and its Application to a Ring Star Problem Generalization. Majid Salari, Zahra Noji-Azima and Paolo Toth.
We address the Capacitated m-Ring-Star Problem (mRSP) in which the goal is to find m rings (simple cycles) visiting a central depot, a subset of customers and a subset of potential (Steiner) nodes, while customers not belonging to any ring must be "allocated" to a visited (customer or Steiner) node. Moreover, the rings must be node-disjoint and the number of customers allocated or visited in a ring cannot be greater than a capacity Q. The objective is to minimize the total visiting and allocation costs. The problem is a generalization of the Traveling Salesman Problem, hence it is NP-hard. We present a new heuristic approach