Séminaire du CIRRELT

Gianfranco Guastaroba

Post-Doc fellow, University of Brescia, Italy

Kernel Search for Capacitated Facility Location Problems

Abstract: Capacitated Facility Location Problems (CFLPs) can be broadly classified into two classes. In the Single Source CFLP each customer has to be assigned to one facility that supplies its whole demand. Conversely, in the Multi Source CFLP each customer's demand may be supplied by one or more facilities. In both versions, the total demand supplied by each facility cannot exceed its capacity. An opening cost is associated with each facility and is paid if at least one customer is supplied from it. The objective is to minimize the total cost of opening the facilities and supplying all the customers. Both problems are NP-hard and classical in the operations research literature. In this seminar, we present a Kernel Search heuristic for the solution of CFLPs. The heuristic is based on the solution to optimality of a sequence of subproblems, where each subproblem is restricted to a subset of the decision variables. Computational results demonstrate the effectiveness of the approach. It found the optimal solution for almost all the instances with a proven optimum. Several best known solutions have been improved for those instances whose optimal solution is still unknown. Variants of the general framework based on variable fixing are proposed aiming at improving the efficiency of the algorithm.

Note: Gianfranco Guastaroba is currently a Post-Doc fellow at the University of Brescia (Italy). He received his BSc degree in "Economics and Management" from the University of Brescia (Italy), his MPhil degree in the area of “Mathematics Research” from the Brunel University, London (United Kingdom), and his PhD in "Computational Methods for Economic and Financial Decisions" from the University of Bergamo (Italy). His research interests focus on the use of operations research methods applied to logistics and routing problems, as well as to financial optimization problems. He is author of 13 papers appeared in peer-reviewed international journals, and he serves as reviewer for several international journals.

Mercredi

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Université Laval

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Jean-François Côté