Nicolas Zufferey

Université de Genève, Suisse / Switzerland

UNCONVENTIONAL ANT METAHEURISTICS FOR COMBINATORIAL OPTIMIZATION

Abstract: Ant algorithms are well-known metaheuristics which have been widely studied since two decades. The recent evolution of such methods could be roughly characterized with the following sentence: "Ant colony optimization: from cumbersome and inefficient constructive algorithms to aggressive powerful techniques".

In classical ant algorithms, the role of each ant is to build a solution in a constructive way, where each decision is based on a tradeoff between the greedy force and the trail system. The greedy force (also called visibility or heuristic information) represents the self-adaptation ability of an ant. The trail system represents the collaboration ability of the ants: it is usually a central memory containing relevant information on the history of the search process.

Other types of ant algorithms have recently emerged out of the common framework of the constructive ant algorithms. On the one hand, different roles are designed for each individual ant, ranging from a negligible help in the decision process to a refined local search method. On the other hand, different ways to select a decision are proposed, which outperform the standard tradeoff between the greedy force and the trail system.

The goal of this talk is to classify and benchmark the unconventional ant algorithms, as well as to highlight their successful elements. Numerical experiments will be presented for problems in the following fields: graph coloring, production scheduling, and location-distribution problems. Moreover, various criteria (e.g., quality, speed, robustness, ease of adaptation, ability to take advantage of the problem structure) will be used to measure the performance of the methods.

Note : Nicolas Zufferey est professeur en gestion des opérations à l'Université de Genève. Il est membre associé au CIRRELT. / Nicolas Zufferey is a full professor in Operations Management at Université de Genève. He is a CIRRELT associate member. N.Zufferey@unige.ch et/and http://www.hec.unige.ch/zufferey

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Université de Montréal

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**Organisateur / Organizer
Jean-Yves Potvin**