

Introduction to the fast track issue for CPAIOR 2016

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The 13th International Conference on Integration of Artificial Intelligence and Operations Research Techniques in Constraint Programming, was held in Banff, Canada, May 29–June 1, 2016. It was co-located with CORS 2016, the conference of the Canadian Operational Research Society.

The aim of the conference is to bring together interested researchers from Constraint Programming (CP), Artificial Intelligence (AI), and Operations Research (OR) to present new techniques or applications in combinatorial optimization and to provide an opportunity for researchers in one area to learn about techniques in the others. A main objective of this conference series is also to give these researchers the opportunity to show how the integration of techniques from different fields can lead to interesting results on large and complex problems. Therefore papers that actively combine, integrate, or contrast approaches from more than one of the areas were especially solicited. Quality papers from a single area were also welcome, provided that they are of interest to other communities involved. Application papers showcasing CP/AI/OR techniques on novel and challenging applications or experience reports on such applications were strongly encouraged.

The call for paper mentioned a Journal fast track where the best papers would be directly submitted to the Constraint Journal while still be presented at the conference. The program committee identified papers that were judged outstanding. The authors were invited to add novel material to their paper and submit it for a second round of review. This process led to the selection of these four papers.

In *Breaking Symmetries in Graph Search with Canonizing Sets*, the authors present a technique that breaks symmetries when the solution of a problem is expressed as a graph. Such problems contain as many solutions as there are isomorphisms. A solver that eliminates a candidate solution can therefore eliminate all isomorphic candidate solutions. The paper shows how to efficiently do it.

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In Computing the Ramsey Number $R(4,3,3)$ using Abstraction and Symmetry breaking, the authors solve an open problem, computing the Ramsey Number $R(4, 3, 3)$, a number related to the graph colouring problem. Their solution is based on abstraction and symmetry breaking.

In A Branch-and-Price-and-Check Model for the Vehicle Routing Problem with Location Resource Constraints, the authors solve a routing problem with pickup and delivery, time windows, and location resource constraints. They decompose the problems using a branch-and-price-and-check algorithm, i.e. a branch-and-price solves a vehicle routing problem and a constraint solver checks for the feasibility of the location resource.

In Multi-Language Evaluation of Exact Solvers in Graphical Model Discrete Optimization, the authors consider optimization languages able to encode NP-Hard problems such as Cost Function Networks, Markov Random Fields, Weighted Partial Max-SAT, 0-1 Linear Programming, and Constraint Programming. They explain how problems expressed in one language can be translated into another formalism. It follows an extensive comparison of exact solvers and the creation of a portfolio able to exploit the complementarity between the solvers.

I would like to thank the reviewers who had to operate on a very tight schedule. This Journal fast track would have not been possible without their efforts.

Claude-Guy Quimper, Quebec City, April 2016