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# Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems

First International Conference, CPAIOR 2004  
Nice, France, April 20-22, 2004  
Proceedings



Springer

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Library of Congress Control Number: 2004103824

CR Subject Classification (1998): G.1.6, G.1, G.2.1, F.2.2, I.2, J.1

ISSN 0302-9743

ISBN 3-540-21836-X Springer-Verlag Berlin Heidelberg New York

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Printed in Germany

Typesetting: Camera-ready by author, data conversion by DA-TeX Gerd Blumenstein

Printed on acid-free paper      SPIN: 10997383      06/3142      5 4 3 2 1 0

# Preface

This volume contains the proceedings of the First International Conference on Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimisation Problems. This new conference follows the series of CP-AI-OR International Workshops on Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimisation Problems held in Ferrara (1999), Paderborn (2000), Ashford (2001), Le Croisic (2002), and Montreal (2003). The success of the previous workshops has demonstrated that CP-AI-OR is becoming a major forum for exchanging ideas and methodologies from both fields. The aim of this new conference is to bring together researchers from AI and OR, and to give them the opportunity to show how the integration of techniques from AI and OR can lead to interesting results on large scale and complex problems.

The integration of techniques from Artificial Intelligence and Operations Research has provided effective algorithms for tackling complex and large scale combinatorial problems with significant improvements in terms of efficiency, scalability and optimality. The benefit of this integration has been shown in applications such as hoist scheduling, rostering, dynamic scheduling and vehicle routing. At the programming and modelling levels, most constraint languages embed OR techniques to reason about collections of constraints, so-called global constraints. Some languages also provide support for hybridization allowing the programmer to build new integrated algorithms. The resulting multi-paradigm programming framework combines the flexibility and modelling facilities of Constraint Programming with the special purpose and efficient methods from Operations Research.

CP-AI-OR 2004 was intended primarily as a forum to focus on the integration of the approaches of CP, AI, and OR technologies. A secondary aim was to provide an opportunity for researchers in one area to learn about techniques in others. 56 papers were submitted in response to the call for papers. After the reviewing period and some online discussions, the program committee met physically at Nice on January 30 and 31. The program committee decided to accept 23 technical papers and 7 short papers. Short papers present interesting recent results or novel thought-provoking ideas that are not quite ready for a regular full-length paper. Both types of papers were reviewed rigorously and held to a very high standard.

CP-AI-OR 2004 has been fortunate to attract outstanding invited talks. Heinrich Braun and Thomas Kasper discussed about the challenges of optimisation problems in supply chain management. Ignacio Grossmann proposed an hybrid framework that uses mathematical and constraint programming for the scheduling of batch chemical processes. Michel Minoux told us about strengthened relaxations for some CP-Resistant combinatorial problems and their potential usefulness.

We wish to thank our generous sponsors who allowed us to offer substantial allowances to students attending the conference in order to cover their expenses. We extend our gratitude to the outstanding program committee who worked very hard under tight deadlines. We are deeply grateful to Claude Michel who worked in the trenches in preparing the CP meeting at Nice and who dealt with all the difficult organisation aspects of this conference.

April 2004

Jean-Charles Régim  
Michel Rueher

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