CP 2004

9th Int. Conference on Principles and Practices of Constraint Programming

And preview of CP 2005

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CP04 chairs

- Program chair: Mark Wallace
- Conference chairs: Fahiem Bacchus & Peter van Beek
CP04 venue

- Toronto Marriott
- 27 Sept - 1 Oct 2004
- Conference dinner 1465ft up
- CN tower
CP04 stats

- LNCS proceedings
- 46/158 accepted papers (29%)
- 16 posters/short papers
- Ever growing size
- >200 delegates
CP04 events

- Doctoral programme
- Workshop programme

9 workshops: Preferences, Symmetry, Applications, Distributed CP, Cooperative CP, Uncertainty & Change, Modelling, Local search, Implementation
CP04 events

- Free tutorial programme
- Symmetry breaking, Gent & Puget
- Distributed constraints, Meisels
- Modelling, Regin
- Online stochastic optimization, van Hentenryck & Bent

Slides on web!
CP04 events

Invited talks

- Constraints in Program Analysis, Podelski
- Challenges for CP: industry view, Puget
- Interface of CS, statistical physics & combinatorics, Selman
CP04 best papers

- Consistency and Random Constraint Satisfaction, Gao & Culberson
- Constraint-based combinators for local search, Van Hentenryck, Michel & Liu
- Unary resource constraint with optional activities, Villim, Bartak & Cepek
- Statistical regimes across constrainedness regions, Gomes, Fernandez, Selman & Bessiere
Some research themes

- **Global constraints**
  - Stretch, cardinality matrix, ...

- **Hybrid methods**
  - CP+MILP, Benders decomposition, Lagrangian relaxation, ...

- **New domains**
  - Set variables, trees, graphs, ...

- **Symmetry**
Set variables

- Hybrid set domains ..., Sadler & Gervet
- Set domain propagation using RODBBS, Lagoon & Stuckey
- Disjoint, Partition & Intersection constraints, Bessiere, Hebrard, Hnich & Walsh
- Global constraints for integer and set value precedence, Law & Lee
What’s a set var?

- Variable whose value is a set of elements
  - Set of golfers in a foursome
  - Set of orders on a slab
  - Set of nurses on duty

  ... Compare with FD var whose value is one element taken from a set
Why use set vars?

- Symmetry
  - value precedence  [Lee & Law]

- Efficiency
  - efficient representations  [Sadler & Gervet], [Lagoon & Stuckey]
  - efficient propagators  [Bessiere et al]
Representing set vars

- Efficiency problem
- Exponential number of possible sets
- We need some “compact” representation
Representing sets: 1st solution

- Upper and lower bounds
  \[ \{a\} \subseteq S \subseteq \{a, b, c\} \]

- Sadler & Gervet’s insight
  - Use any partial ordering, not just subset. E.g. lexicographic order
  - In fact, use several orderings at same time
Representing sets: 2nd solution

- Set can be represented by characteristic function (0/1 vector)
- Lagoon & Stuckey’s insight
  - Set of possible sets can be represented by Boolean function
  - Boolean functions can often be “compactly” represented using Binary Decision Diagrams
Efficient propagators

- Global constraints
  - Very important aspect of CP
  - Bessiere et al study some global constraints over set vars
  - Either give polynomial propagator
  - Or show propagating NP-hard
Efficient propagators

- Disjoint([S1, ..., Sn])
  - |Si ∩ Sj| = 0

- Partition([S1, ..., Sn], S)

- Disjoint([S1, ..., Sn]), ∪ Si = S

- Intersection([S1, ..., Sn], k)
  - |Si ∩ Sj| = k
Sets and symmetry

- Sets eliminate some symmetry
  - Order within set
- But what if we have several sets?
  - Multiset order sets [IJCAI 2003]
- Or symmetric values?
  - Lee & Law’s global value precedence constraints [CP 2004]
CP05 preview

- Sitges, Spain
- Oct 1-5, 2005
- Co-locations
- ICLP
- annular eclipse
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CP05 invited talks

Invited talks

- Inference & search in planning, Geffner
- OWL: a DL based ontology language, Horrocks
- Preference reasoning, Rossi
- G12 project, Stuckey
CP05 tutorials

- SAT and its relationship to CSPs, Bacchus
- Advances in Solving Combinatorial Optimization Problems, Dechter
- Programming with a Chinese Horse, Fruehwirth
- Heavy-tails, Backdoors, Restarts, Gomes
See you in Spain!