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Constraint programming and operations research. (English) Zbl 1402.90148
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Summary: We present an overview of the integration of constraint programming (CP) and operations research (OR) to solve combinatorial optimization problems. We interpret CP and OR as relying on a common primal-dual solution approach that provides the basis for integration using four main strategies. The first strategy tightly interweaves propagation from CP and relaxation from OR in a single solver. The second applies OR techniques to domain filtering in CP. The third decomposes the problem into a portion solved by CP and a portion solved by OR, using CP-based column generation or logic-based Benders decomposition. The fourth uses relaxed decision diagrams developed for CP propagation to help solve dynamic programming models in OR. The paper cites a significant fraction of the literature on CP/OR integration and concludes with future perspectives.

MSC:

90C27 Combinatorial optimization

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Keywords:

constraint programming; operations research; hybrid optimization

Software:

CHIP; G12; ILOG SCHEDULE; MiniZinc; SCIL; SCIP; SIMPL; TSPTW

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