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Decision Diagrams for Sequencing and Scheduling Problems

Abstract: Decision diagrams (DDs) are compact graphical representations of Boolean functions, originally introduced for circuit design and formal verification. Recently, DDs have been used as a means for obtaining discrete relaxations for combinatorial optimization problems, with successful applications in problems such as maximum cut and maximum clique on graphs. In this talk, we discuss how DD-based relaxations can also be a powerful tool for modeling and solving a variety of sequencing and scheduling problems. We describe techniques which allow the relaxation to be combined with constraint programming and integer programming technologies, in particular by incorporating dual information in the form of Lagrangian multipliers or reduced costs from linear programming relaxations of the problem. Computational experiments on scheduling problems indicate that this technique can improve solving times substantially compared to other generic-purpose methods.

Note: André A. Cire est professeur adjoint au département de Management. / André A. Cire is Assistant Professor at the Department of Management.

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