

Solution methods for large scale real life integer programming problems

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Abstract

The real life applications in vehicle and crew scheduling for airline, bus and rail transportation produce very large MIP models with large gaps in some cases. To solve this, I will present a combination of mathematical programming techniques:

- Column generation reducing the number of variables in the LP and reducing the integrity gap by solving sub-problems at integrity with specialized algorithms;
- Dynamic constraint elimination reducing the size of the LP base and producing less fractional solutions;
- Branch-and-bound and cuts adapted to column generation and problems with complex polyhedron.

The performances of these techniques will be illustrated by results on real life problems.