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Title: An advanced initialization procedure for the simplex algorithm

Abstract:

This paper addresses the computation of an initial basis for the simplex algorithm for linear programming. We propose six algorithms for constructing an initial basis that is sparse and will reduce the fill-in and computational effort during LU factorization and updates. Over a set of 62 large benchmarks, the best proposed algorithm produces remarkably sparse starting bases. Taking into account only the hard instances, the proposed algorithm results in 23% and 30% reduction of the geometric mean of the execution time of CPLEX's primal and dual simplex algorithm, respectively.

Keyword 1: Linear and nonlinear optimization

Keyword 2: Large- and Huge-scale optimization