

A Column Generation Approach to Capacitated P-Median Problems

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Abstract

The Capacitated p -median problem (CPMP) objectives the optimal location of p facilities, considering distances and capacities for the service to be given by each median. We present a column generation approach to CPMP. The identified restricted master problem optimizes the covering of 1-median clusters satisfying the capacity constraints, and new columns are generated considering knapsack subproblems. The Lagrangean/surrogate relaxation has been used recently to accelerate subgradient like methods. In this work the Lagrangean/surrogate relaxation is directly identified from the master problem dual and provides new bounds and new productive columns through a modified knapsack subproblem. The overall column generation process is accelerated, even when multiple pricing is observed. Computational tests are presented running instances taken from the literature.

Key words: Location problems, Capacitated p -median problems, Column generation, Lagrangean/surrogate relaxation.