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A fixed-parameter tractability result for multicommodity demand flow in trees. (English)
Zbl 1184.68357

Summary: We study an NP-hard (and MaxSNP-hard) problem in trees—Multicommodity Demand Flow—dealing with demand flows between pairs of nodes and trying to maximize the value of the routed flows. This problem has been intensively studied for trees as well as for general graphs mainly from the viewpoint of polynomial-time approximation algorithms. By way of contrast, we provide an exact dynamic programming algorithm for this problem that works well whenever some natural problem parameter is small, a reasonable assumption in several applications. More specifically, we prove fixed-parameter tractability with respect to the maximum number of the input flows at any tree node.

MSC:
68R10 Graph theory (including graph drawing) in computer science
68W05 Nonnumerical algorithms
68R05 Combinatorics in computer science

Keywords:
combinatorial problems; graph algorithms; NP-hard problems; exact algorithms; fixed-parameter tractability

Full Text: DOI

References:
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