

Approximate Solution of Length-Bounded Maximum Multicommodity Flow with Unit Edge-Lengths ^{*}

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We propose an improved fully polynomial-time approximation scheme (FP-TAS) and a greedy heuristic for the fractional length-bounded maximum multicommodity flow problem with unit edge-lengths [1]. The proposed FPTAS has a lower time complexity bound compared to the previously known algorithm [2] designed for a problem with the length functions of more general form.

Computational experiments are carried out on benchmark graphs and on graphs that model software defined satellite networks to compare the proposed algorithms and an exact CPLEX LP solver. The results of experiments demonstrate a trade-off between the computing time and the precision of algorithms under consideration. The FPTAS and greedy heuristic are significantly faster than the CPLEX LP solver, especially on the instances with large networks and great numbers of demands. The FPTAS is more accurate but requires greater CPU time than greedy heuristic, which may be a decisive factor in practical applications.

References

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