

On the k edge-disjoint 2-hop-constrained paths polytope

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Abstract

Given a graph $G = (N, E)$ with $s, t \in N$, a cost on each edge of E , and a fixed integer $k \geq 2$, the k edge-disjoint 2-hop-constrained paths problem consists in finding a minimum cost subgraph such that between s and t there exist at least k edge-disjoint paths of at most 2 edges. In this paper, we give an integer programming formulation for this problem and study the associated polytope, $P_k(G, 2)$. In particular, we give a minimal complete linear description of $P_k(G, 2)$. As a consequence, we obtain a polynomial time cutting plane algorithm for the problem.