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Delegate and Conquer: An LP-based approximation algorithm for Minimum Degree MSTs

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Abstract

We study the minimum degree minimum spanning tree problem: Given a graph and a nonnegative cost function on the edges, the objective is to find a minimum cost spanning tree under the cost function (MST) such that the maximum degree of any node in the MST is minimized.

We obtain an algorithm which returns a MST of maximum degree at most $(D + k)$ where D is the minimum maximum degree of any MST and k is the distinct number of costs in any MST. We use a lower bound given by a linear programming relaxation to the problem and strengthen known graph-theoretic results on minimum degree subgraphs to prove our result. Previous results for the problem used a combinatorial lower bound which is weaker than the LP bound we use.

Joint work with Mohit Singh.