

Finding Almost Tight Witness Trees

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Abstract: This paper addresses a graph optimization problem, called the Witness Tree problem, which seeks a spanning tree of a graph minimizing a certain non-linear objective function. This problem is of interest because it plays a crucial role in the analysis of the best approximation algorithms for two fundamental network design problems: Steiner Tree and Node-Tree Augmentation. We will show how a wiser choice of witness trees leads to an improved approximation for Node-Tree Augmentation, and for Steiner Tree in special classes of graphs.

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