

Improving Solution for a Graph Partitioning Problem under Capacity Constraint

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Abstract: We study a variant of the graph partitioning problem where the weight of a cluster in the partition depends on the edges incident to its nodes. The capacity constraint is that the weight of each cluster is bounded by a constant C . This problem was first proposed in the context of optical networks design. In a previous work (Bonami et al., LNCS 7422, 2012) two 0/1 non-convex quadratic programming models have been proposed for the problem: the Node-Node (NN) models and the Node-Cluster (NC) model. Several linearization/convexification methods have been studied for solving the NN model but it also has been reported that the classical Fortet's linearization method for the NC model outperforms the best method for the NN model. In this paper, we propose a new linearization/convexification method for the NC model, based on a method of Sherali and Smith (*Optimization Letters*, Vol. 1, 2007). Experimental results show that the new method helps Branch-and-Bound algorithms going ten to twenty times faster than the classical Fortet's linearization method.

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