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A Tight Semidefinite Relaxation of the Cut Polytope

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Abstract We present a tight semidefinite programming (SDP) relaxation for the max-cut problem (MC) which improves on several previous SDP relaxations in the literature. This new SDP relaxation is a tightening of the SDP relaxation recently introduced by the authors, and it inherits all the helpful properties of the latter. We show that it is a strict improvement of the SDP relaxation obtained by adding all the triangle inequalities to the well-known SDP relaxation.

Keywords Max-cut problem, semidefinite relaxations, cut polytope, metric polytope.