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*"La mente è come un paracadute.
Funziona solo se si apre"
A. Einstein*

An SDP-based branch-and-bound approach for non-convex quadratic integer programming

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Abstract

We discuss semidefinite relaxations for general quadratic mixed-integer optimization problems with box constraints, where convexity is not required. These relaxations yield tight bounds and are computationally easy to solve for medium-sized instances, even if some of the variables are integer and unbounded. In this case, our model contains an infinite number of linear constraints; these constraints are separated dynamically. In case of a convex objective function, the new SDP bound improves the bound given by the continuous relaxation of the problem. The dual bounds obtained from our SDP relaxation are embedded into a simple branch-and-bound framework. Numerical experiments show that this approach performs well on various types of non-convex instances.