Trust region relaxation in combinatorial optimization

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Abstract

Recently we developed several heuristic methods for the maximum clique problem based on trust region relaxation of various quadratic programming formulations of this problem [2, 3]. This approach showed exceptional computational efficiency on the maximum clique instances hardest for all other methods that may be found in the literature (Brockington-Culberson graphs [1]). In this presentation we dicsuss further developments of the approach and its extension to other hard combinatorial optimization problems.

References

[1] M. Brockington and J.C. Culberson, Camouflaging independent sets in quasi-random graphs, in: D. Johnson and M.A. Trick, eds., *Cliques, Coloring and Satisfiability, DIMACS Ser. Discrete Math. Theoret. Comput. Sci.* **26** (AMS, Providence, RI, 1996) 75–88.

[2] S. Busygin, S. Butenko, and P.M. Pardalos, A heuristic for the maximum independent set problem based on optimization of a quadratic over a sphere, *Journal of Combinatorial Optimization* **6**:3 (2002) 287–297.

[3] S. Busygin, A new trust region technique for the maximum weight clique problem, *Combinatorial Optimization '02, Paris, April 8-10 2002*, *Submitted manuscript*, `http://www.busygin.dp.ua/npc.html`

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