Title : Approximation Algorithms for Generalizations of Maximum Quadratic Assignment Problem on b-Matching and on Restricted Matching

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ABSTRACT

We study approximation algorithms for two natural generalizations of the Maximum Quadratic Assignment Problem (MaxQAP). In the *Maximum List-Restricted Quadratic Assignment Problem*, each node in one partite set may only be matched to nodes from a prescribed list. For bipartite graphs whose each partite set has n nodes and every list has size at least $n - O(\sqrt{n})$, we design a randomized $O(\sqrt{n})$ −approximation algorithm based on the linear-programming relaxation and randomized rounding framework of Makarychev, Manokaran, and Sviridenko. In the *Maximum Quadratic b-Matching Assignment Problem*, we seek a b-matching that maximizes the MaxQAP objective. We refine the standard MaxQAP relaxation and combine randomized rounding over b independent iterations with a polynomial-time algorithm for maximum-weight b-matching problem to obtain an $O(\sqrt{bn})$-approximation. When b is constant and all lists have size $n - O(\sqrt{n})$, our guarantees asymptotically match the best-known approximation factor for MaxQAP.

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