

# Multilevel Quadratic Programming Techniques for Graph Partitioning

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In earlier work, we showed that the NP complete graph partitioning problem could be reformulated as a continuous quadratic programming problem. We now embed this quadratic programming problem into a multilevel algorithm. The subproblems obtained by the multilevel coarsening of the initial graph are approximately solved using a series of continuous quadratic programming techniques, including gradient projection methods for computing local minimizers, sphere constrained global minimization methods for computing solutions over approximations to the feasible set, and a block exchange quadratic programming technique for escaping from local minimizers. Numerical comparisons are given with the code METIS, a multilevel algorithm based on the Fiduccia/Mattheyses exchange techniques for treating the subproblems.