Improving interior point methods with continued iteration

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ABSTRACT

The predictor corrector interior point method have been widely used to determine an optimal solution of linear programming problems, due to its efficiency and fast convergence. This iterative method determines a direction solving two linear systems in each iteration with the same symmetric positive definite matrix. One approach used to solve these linear systems is the Cholesky factorization. However, for many problems this factorization has a high computational cost. Thus, we propose the continued iteration approach in order to reduce of total computational time that it needs to obtain a linear programming problem optimal solution. The continued iteration consists in determining a new direction. This new direction is combined with the predictor corrector direction already computed by method. With the new direction is possible that a largest step size may be given, allowing reduction of infeasibilities. Although there is an computational effort increase per iteration to compute the continued iteration, the expected reduction in the number of iterations, enables to decrease the total computational time. Numerical experiments of the predictor corrector method with multiple centrality corrections, combined with the continued iteration for medium to large scale problems are performed.