Piecewise Linear NCP Function for QP-free Feasible Method

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Abstract: In this talk, a QP free feasible method with piecewise NCP functions is proposed for the minimization of a smooth function subject to smooth inequality constraints. The new NCP functions are piecewise linear-rational, regular pseudo-smooth and have nice properties. This method is based on the solutions of linear systems of equations reformulation of the KKT optimality conditions, by using the piecewise NCP functions. The method is an iterative method in which, locally, the iteration can be viewed as a perturbation of a Newton or Quasi Newton iteration on both the primal and dual variables for the solution of the equalities in the KKT first order conditions of optimality. This method ensures feasibility of all iterations. We modify the Qi and Qi method slightly to obtain the local convergence under some weaker conditions. In particular, this method is implementable and globally convergent without assuming that the strict complementarity condition, the isolatedness of the accumulation point and the linear independence of the gradients of active constrained functions. The submatrix, which may be obtained by the Newton or Quasi Newton methods, do not be requested uniformly positive definite. We also prove that the method has superlinear convergence rates under some mild conditions.