

Newton-type Methods for Fritz-John Systems of Generalized Nash Equilibrium Problems

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Abstract

A well-known approach for solving a generalized Nash equilibrium problem (GNEP) is to consider a necessary optimality condition and to reformulate it as a nonsmooth system of equations. Frequently, the Karush-Kuhn-Tucker (KKT) conditions of all players are concatenated. It was shown [1] that, due to the lack of a suitable constraint qualification, solutions of a GNEP may exist that do not satisfy the KKT but the Fritz-John (FJ) conditions. The corresponding nonsmooth system of equations is (similar to the KKT case) underdetermined since we assume that there are constraints shared by all players. We show that some Newton-type methods [2, 3] recently developed for certain constrained systems of nonsmooth equations can be successfully applied to a nonsmooth system that is equivalent to the FJ conditions for GNEPs. In particular, we provide conditions for local quadratic convergence which are weaker than existing ones.

References

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