

A FEASIBLE DIRECTION ALGORITHM FOR THE GENERALIZED NASH EQUILIBRIUM PROBLEM

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Abstract: The Generalized Nash Equilibrium Problem (GNEP) is an extension of the Nash Equilibrium Problem (NEP). This one involves two or more players; each player is associated with a feasible strategy set and a payoff function. It is assumed that there is not collaboration among the players. The difference between GNEP and NEP is that the feasible set of the GNEP depends on the strategies set of the others players. We develop a feasible point Newton-like algorithm for the Generalized Nash Equilibrium problem (GNEP) with shared constraints. For a given interior initial point, we propose an algorithm that generates a feasible sequence converging to the solution of the normalized equilibrium problem. At each iteration, for each player, a feasible descent direction is computed by solving two linear systems with the same matrix. Considering the sum of the Lagrangians corresponding to each player we can generate a pseudo gradient used to perform an Armijo-like line search along each feasible descent direction. The present approach was already employed for several test problems, showing to be very strong and efficient. A set of numerical results is presented to confirm this conclusion.