

Department of Mathematics

University of Houston

## Scientific Computing Seminar

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### Generalized Nash Equilibrium Problems in Banach Spaces

Thursday, March 5, 2015

1:30 PM- 2:30 PM

Room 646 PGH

**Abstract:** A class of non-cooperative Nash equilibrium problems is presented, in which the feasible set of each player is perturbed by the decisions of their competitors via a convex constraint. In addition, for every vector of decisions, a common “state” variable is given by the solution of an affine linear equation. Due to the presence of an additional constraint on the state, the problem cannot be reduced to the classical setting as considered in work by Nash. The resulting problem is therefore a generalized Nash equilibrium problem (GNEP).

The existence of an equilibrium for this problem is demonstrated and first order optimality conditions are derived under a constraint qualification. An approximation scheme is proposed, which involves the solution of a parameter-dependent sequence of standard Nash equilibrium problems. This leads to the need for a new type of path-following strategy, which uses a value function based in part on the Nikaido-Isoda function. Function-space-based numerics for parabolic GNEPs and a spot-market model are developed, and numerical results are presented.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.