

Generalized Nash Equilibrium Problems

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This talk considers a generalization of the standard Nash game that is usually called a Generalized Nash Equilibrium Problem (GNEP for short) or a Nash Equilibrium Problem with Coupled Constraints. The recent interest in GNEPs comes from the deregulation of the electricity markets, however, GNEPs also arise in many other applications like in the internet due to some joint capacity constraints or in the environmental sciences due to upper bounds on cumulative emissions.

The talk is divided into three parts: We begin with an elementary introduction to the classical Nash equilibrium problem, present some famous examples and review the basic solution methods for Nash games with continuous strategy sets.

The second part deals with the GNEP itself. Here we also present a few examples, consider two solution concepts, and give a short survey of existing methods for the numerical solution of GNEPs.

The third part of the talk considers some new optimization-based approaches for the solution of GNEPs. We discuss their properties as well as their advantages and disadvantages in comparison to other methods. Some preliminary numerical results will also be shown.

Part of this talk is based on joint research with Anna von Heusinger.