Computation of (generalized) Nash equilibria

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When John Nash introduces an equilibrium concept in his seminar paper Nash (1950) for n-player games. Soon after, Debreu (1952) generalized the Nash equilibrium concept for his abstract economy by allowing the strategy space of players to depend on others player actions. From that time, the concept was known as generalized Nash equilibrium (GNE).

Applications of GNE can be found in many fields, e.g. economics, engineering, mathematics, computer science, operational research. However, the computational side of the GNE has not been very studied since his introduction in the 50's, because of its mathematical-economic origin according to Facchinei and Kanzow (2009). Only recently, papers such as Facchinei and Kanzow (2009), von Heusinger and Kanzow (2009) and Nabetani et al. (2009) focus on this topic.

The presentation will focus on computational methods when working with continuous strategy space, i.e. excluding matrix games. In the current litterature, there are three main approaches to solve GNE problem: (i) fixed-point algorithms, (ii) gap function minimization and (iii) extended KKT system solving methods. These approaches are implemented in the *R* package **GNE**[1] by three distinct functions: `fixedpoint`, `minGap` and `NewtonKKT`.

References

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[1] available on R-forge.