

THE MS2DISCOVERY INTERDISCIPLINARY RESEARCH INSTITUTE

WATERLOO | CANADA

Novel applications of generalized Nash games

Monica Cojocaru | University of Guelph

In this talk we introduce the audience to the concept of generalized Nash games; these are a class of Nash games introduced in the 50's, currently undergoing a sustained interest from the mathematics and engineering communities, due to advances in possible solution techniques, as well as their potential for applications.

We therefore will focus our talk in two directions: one more theoretical, where we introduce a parametrization technique for the purpose of describing entire solution sets of generalized Nash games with shared constraints. We prove two theoretical results and, based on these, we introduce a computational method that practitioners can implement in applied problems modeled as generalized Nash games with shared constraints, as long as the applied problems are satisfying several assumptions present in the current optimization literature.

We then move into the second direction, where we give many illustrative examples of how our computational technique is used to compute the solution sets of known generalized Nash games previously not solved by other existing techniques. We close with the presentation of two very different applied problems formulated as a generalized Nash game: a model of an environmental accord between countries sharing geographic proximity, and another model of several HIV+ and HIV- individuals engaged in casual encounters which may lead to the spread of HIV. We highlight the possible advantages of modeling these problems as generalized Nash games, as well as the diversity of applications that could be targeted with this modelling framework.



Monica Cojocaru is an Associate Professor of Mathematics in the Mathematics & Statistics Department at the University of Guelph. She completed her BSc and MSc in Mathematics at the University of Bucharest (Romania) and her PhD in Mathematics at Queen's University in Kingston, Canada. She held an NSERC postdoctoral fellowship at the Centre des Recherches Mathématiques (CRM) in Montreal in 2003 before her NSERC University Faculty Award position started at Guelph (2003-2008). Her research interests are in studying population behaviour and decision making using game theory, variational analysis and constrained dynamics. Over the years she held several visiting positions at the Centre des Recherches Mathématiques, The Fields Institute, Harvard and Northwestern Universities and at University of Brescia. Most recent visiting positions were held at GERAD Montreal and Lehigh University, as a Senior Visiting Research fellow. She held one of only two Canada-US Fulbright Visiting Research Chair positions awarded in 2010 in the Department of Mathematics at the University of California at Santa Barbara. Her research was supported by NSERC, City of Guelph, Ontario Centers of Excellence and Canada Foundation for Innovation. Most recently she was awarded an NSERC Engage grant on a research project with Canada Sanofi Pasteur.

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Refreshments will be provided

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