Preface

Algorithms and Economic Dynamics

This special issue of the Journal of Economic Dynamics and Control contains a selection of papers presented at the Second Annual Meeting of the Society for Computational Economics. This meeting was held in Geneva, Switzerland and hosted by Manfred Gilli. We first want to thank Prof. Gilli for organizing the meeting and his hospitality.

The papers in this issue cover a wide range of methods and subjects. The first one is Bernardo A. Huberman's paper, 'Computation as economics' which draws out several connections between computation and economics. The evolution of beliefs and strategies is an important topic in computational economics. Jasmina Arifovic and Curtis Eaton discuss these issues in a communication game in 'The evolution of type communication in a sender/receiver game of common interest with cheap talk'. Robert Marks studies evolution in oligopoly in 'Evolved perception and behavior in oligopolies'. William Brock and Cars Hommes model the evolution of expectations in dynamic asset markets in 'Heterogeneous beliefs and routes to chaos in a simple asset pricing model'.

The next group of papers focus on alternative methods for solving rational expectations models. Manfred Gilli and Giorgio Pauletto utilize inexact Newton methods in 'Krylov methods for solving models with forward-looking variables'. Michel Juillard, Douglas Laxton, Peter McAdam, and Hope Pioro use MULTIMOD to compare the performance of alternative solution methods in 'An Algorithm competition: First-order iterations versus Newton-based techniques'. A.J. Hughes Hallett and Laura Piscitelli present a reordering scheme to help Gauss–Seidel methods converge in 'Simple reordering techniques for expanding the convergence radius of first-order iterative techniques'.

Many rational expectations problems reduce to operator equations in functional spaces. Jenny X. Li presents a complete analysis of a monetary model in 'Numerical analysis of a nonlinear operator equation arising from a monetary model'. Peter Zadrozny discusses solution methods for linear rational expectations models in 'An eigenvalue method of undetermined coefficients for solving linear rational expectations models'. General equilibrium with incomplete asset markets present special difficulties because demand correspondences fail to be continuous. Karl Schmedders describes an intuitive homotopy method for solving such models in 'Computing equilibria in the general equilibrium model with incomplete asset markets'.

There has been much effort to develop methods for solving problems which arise in financial economics, particularly related to option pricing. David Luenberger presents tree methods for multiple assets in 'Products of trees for investment analysis'. Dietmar P.J. Leisen studies the convergence properties in 'Pricing the American put option: A detailed convergence analysis for binomial models'. Ivailo Izvorski develops finite-difference methods related to option problems in 'A nonuniform grid method for solving PDEs' and Patrick Hénaff uses stochastic optimization methods in 'Hedging exotic derivatives through stochastic optimization'.

Anna Nagurney and Ding Zhang combine the versatility of variational inequality methods with the power of supercomputing in 'A massively parallel implementation of a discrete-time algorithm for the computation of dynamic elastic demand traffic problems modeled as projected dynamical systems'. Since modern economic theory has embraced game theory, there will be increasing demand for computational methods for computing equilibria. Jacob C. Engwerda discusses computational issues of dynamic games in 'Computational aspects of the open-loop Nash equilibrium in linear quadratic games'.

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Guest-editor