

Computational Economy Equilibrium and Application

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Abstract. The rise of the Internet and the emerging E-Commerce applications has created new economic markets of unprecedented scale. They have introduced many cross-disciplinary challenges in mathematics and computer scientists, and engineering, one of which is the algorithmic and complexity issue of economy market equilibrium theory. In this talk, we examine the mathematical connections as well as the computational equivalences between equilibrium and optimization, between game equilibrium and market equilibrium, existence and NP-hardness, and between exact computation and approximation. Being able to compute equilibria numerically also significantly expands the applicability of game/economy equilibrium theory to a wide range of decision problems. We present applications of computational equilibrium from developing communication network protocols in spectrum management and resource allocation to adopting free trade policies in international trade between nations.