

Computer Science Theory Seminar

Proportional dynamics in exchange and production economies

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Abstract: We consider a simple variant of the von Neumann model of an expanding economy, in which multiple producers make goods according to their production function. The players trade their goods at the market and then use the bundles acquired for the production in the next round. We study a simple decentralized dynamic—known as proportional response—in which players update their bids proportionally to how useful the investments were in the past round. We show this dynamic leads to growth of the economy in the long term (whenever growth is possible) but also creates unbounded inequality, i.e. very rich and very poor players emerge. We analyze several other phenomena, such as how the relation of a player with others influences its development and the Gini index of the system.

I will also discuss this dynamical system when the amounts of the players are fixed over time and show that it converges to market equilibria from any starting configuration.

This is based on joint work with Mehta and Nisan (<https://arxiv.org/pdf/1802.07385.pdf>), and with Devanur and Rabani (<https://arxiv.org/pdf/1907.05037.pdf>)

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