Algorithmic game theory

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1st lecture

October 8th 2020

Basic info

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- Webpage: *https://kam.mff.cuni.cz/ balko/ath12021/ATH.html*
  - lecture info, topics covered, presentations, lecture notes ...

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- Recommended literature:
  - M. Balko: Algorithmic game theory: lecture notes.
  - The notes are still under construction. Comments are welcome.

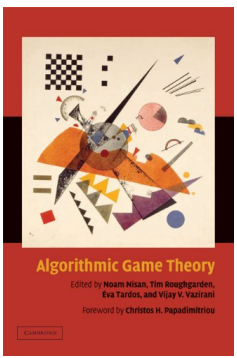

Figure: Algorithmic game theory by Nisan et al.

Source: https://amazon.com

Game theory

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- study of mathematical models of strategic interaction among rational decision-makers.

Zdroj: https://quantamagazine.org

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- We focus on the algorithmic side of the game theory.
- Several real-word applications.
- More than ten game theorists have won the Nobel Prize in economics.

Sylabus

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- Preliminary plan:

Sylabus

- Preliminary plan:
  - Finding Nash equilibria
    - Nash equilibria and Nash's Theorem,
    - zero-sum games,
    - bimatrix games and the Lemke–Howson algorithm,
    - other notions of equilibria,
    - regret minimization.
  - Mechanism design,
    - auctions (Vickrey),
    - Myerson's lemma and its applications,
    - revenue maximization.

Finding Nash equilibria

Nash's Theorem

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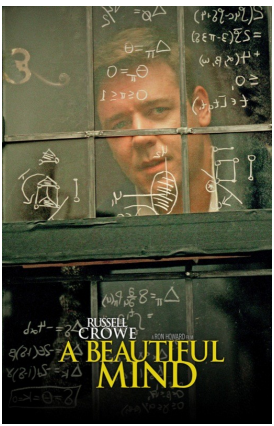

Figure: John Forbes Nash Jr. (1928–2015) and his depiction in the movie A Beautiful mind.

Sources: https://britannica.com and https://medium.com

Figure: John Forbes Nash Jr. receiving a Nobel prize for economics.

Source: https://pbs.org

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Thank you for your attention.