From *Rock, Paper, Scissors* to *Street Fighter II*: Proof by Construction

Yotam I. Gingold
Rock, Paper, Scissors
Matching Pennies
Game Theory

Optimal strategy is choosing randomly. On average, outcome is a draw.
The class of RPS-style games

A competitive series of decisions with no long-term advantage accumulation and access at every decision to a set of moves that include trumps of opponents’ moves
Choices Graph
Choices Graph

Dog → Cat → Mouse → Cheese

Dog → Cat → Mouse → Cheese → Elephant
Sinks have no trump
Poker

Credit: Kevin Labianco
Long-term strategy games

Advantage accumulation

Credit: Simon Pais
Variations
Street Fighter II
The Dojo / Kung Fu movies
Button mashing

Randomly choosing throws

Credit: Advanced Media, Inc.
Street Fighter II variants
Future Work

Choice graph for Street Fighter II
Constructive analysis on other game types
Space Invaders and Doom

Space Invaders
Space Invaders and Doom

Space Invaders
Asteroids
Centipede
Space Invaders and Doom

- Space Invaders
- Asteroids
- Centipede
- Robotron 2084
- Crystal Quest
- Contra
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- Doom
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Mike Tyson’s Punch-Out
Variations

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