

Game Theory and Control

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github.com/silvasta/summary-gtc



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1 Static games

1.1 Basic Definitions

Game theory is the study of mathematical models of conflict and cooperation between rational decision-makers.

Several things are needed to characterize a game:

- The **players** are the agents that make decisions
- The **actions** available to each player at each decision point

- The **information structure** specifies what each player knows before making each decision, in particular with respect to other players' decisions

- The **outcome** for each player, which depends on all players' decisions

1.1.1 Matrix representation

1.1.2 Nash Equilibrium

1.1.3 Dominated actions

1.1.4 Reduced game

1.1.5 Security levels and policies

1.2 Multiple Nash Equilibria

1.2.1 Admissible Nash Equilibria

Poset

Hasse diagram

Minimal element

1.3 Mixed strategies

Careful! Refer to deterministic strategies as pure strategies!

1.3.1 Security levels

Mixed security level

Mixed security strategy

Computational complexity

1.3.2 Mixed Nash Equilibrium

1.4 Nash Theorem

2 Zero-sum games

3 Auctions

4 Potential games

5 Convex games

6 Stackelberg games

7 Repeated games

8 Multistage games

9 Linear-quadratic games

10 Stochastic games