

An Epistemic Course in Game Theory

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1 Introduction

1.1 What is Game Theory about?

Game Theory is about situations in which you make a choice, but where the final outcome depends also on the choices of others.

Examples: Everyday life, Managerial decision making, Playing chess, etcetera.

Such situations are called **games**, and the persons involved are called **players**.

1.2 Epistemic models

Before you make a choice in a game, you must form a belief about what your opponents will do.

In order to do so, you must also form a belief about what your opponents think that others will do.

That is, you must **reason** about your opponents.

Epistemic models in game theory try to formalize possible ways in which players may reason about their opponents.

1.3 My approach in this course

I will investigate games from the **perspective of a single player**.

I will use the following general procedure:

1. Present an **intuitive way of reasoning** about my opponents.
2. Develop an **epistemic model** for this way of reasoning.
3. Which **choices** can I rationally make if I follow this way of reasoning?
4. Can these choices be computed by means of an **algorithm**, or **characterized in an easy way**?

1.4 Outline of this course

Part I : Standard beliefs in static games

Lecture 1:

Common belief in rationality

Lecture 2:

An epistemic foundation for Nash equilibrium

Part II : Lexicographic beliefs in static games

Lecture 3:

Common weak belief in rationality

Lecture 4:

Proper rationalizability

An epistemic foundation for iterated weak dominance

Part III : Conditional beliefs in dynamic games

Lecture 5:

Common initial belief in rationality

Lecture 6:

Common strong belief in rationality

Epistemic foundations for backward induction

1.5 Surveys on Epistemic Game Theory

Adam Brandenburger (2007): “The power of paradox: Some recent results in interactive epistemology”

Geir Asheim (2006): “The consistent preferences approach to deductive reasoning in games”

Andrés Perea (?): “Reasoning about your opponents: An epistemic course in game theory” (in progress)

1.6 References

Adam Brandenburger (2007): “The power of paradox: Some recent results in interactive epistemology”, *International Journal of Game Theory* 35, 465-492.

Geir Asheim (2006): “The consistent preferences approach to deductive reasoning in games”, *Theory and Decision Library*, Springer, Dordrecht, The Netherlands.

Andrés Perea: “Reasoning about your opponents: An epistemic course in game theory”, In progress.