

Module 5: "Dynamic games of incomplete information"

Lecture 40: "Game Theory : Overview"

The Lecture Contains:

☰ Representation of Games , Types of Games, Solution Concept, Applications

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Representation of Games , Types of Games

- Games – Formal representation of a situation in which a number of individuals interact in a setting of strategic interdependence
- Games can be represented in two alternative ways.
 - Normal form representation(payoff matrix)
 - Extensive form representation(game tree)
- Games can be classified in different ways :

Timing of moves	
Simultaneous move/static games	Sequential move/dynamic games
↓	↓
Here all players take the strategies simultaneously	Here players take turns in moving

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Representation of Games , Types of Games[Contd...]

Nature of Information	
<ul style="list-style-type: none"> Games with complete information <ul style="list-style-type: none"> Here the payoffs of all players are common knowledge 	<ul style="list-style-type: none"> Games with incomplete information <ul style="list-style-type: none"> Here some players do not know the payoff functions of other players

- Hence the games can be classified in the following manner

	Static	Dynamic
Complete Information	Static Games with complete information	Dynamic Games with complete information
Incomplete Information	Static Games with Incomplete information	Dynamic Games with Incomplete information

- Usually normal form representation is used for static games
- Extensive form representation is used for dynamic games.
- Dynamic games can also be represented in normal form
 - Distinction should be made between action and strategy.
- Static games can also be represented by game tree(characterized as games of imperfect information)
 - Presence of at least one non singleton information set
- Dynamic games with perfect information
 - Only singleton information set
- Dynamic games with imperfect information
 - At least one non-singleton information set

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Solution Concept

- Solution by iterated limitation of dominated strategies(IEDS)
- Nash Equilibrium
Note : NE is a broader solution concept and has greater predictability power.
NE – appropriate solution concept for static games with complete information
- Refinement of equilibrium concept of NE to rule out unreasonable equilibria
 - Dynamic games with complete information
 - Sub game perfect Nash equilibrium(SPNE)
 - Static games with incomplete information
 - Bayesian Nash Equilibrium
 - Dynamic games with incomplete information
 - Perfect Bayesian Nash Equilibrium

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Applications

- Static games with complete information
 - Cournot Game
 - Bertrand Game
 - Tragedy of Commons
- Dynamic games with complete information
 - Stackelberg Game
 - Tariffs and Imperfect competition
- Static games with incomplete information
 - Cournot game with asymmetric information
- Signaling games(special type of dynamic games with incomplete information)
 - Hiring of faculty members by Academic Department
 - Limit pricing Model(Entrant-Incumbent Game)

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