Game Theory

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HISTORY:

The theory of games started in the 20th century. In the year 1928 Von Neumann, who is also called the father of game theory, developed the theory of games. It is based on minimax principle which implies that each competitor will act as so minimize his maximum loss or maximize his minimum gain.

- Game: Game is defined as an activity between two or more persons based on a set of rules in which each side initiate, a series of steps based on their strategies to convert the situation favourable to itself; winning or loss involve stakes.

CHARACTERISTICS OF GAMES

Following are the characteristics of games:

(i)   There are finite number of participants called players.

(ii) Each Participants has a finite number of possible courses of action.

(iii) Game is said to be played when both participants initiate actions based on their chosen strategy.

(iv) Every game leads to an outcomes.

(v) Every outcome has stakes viz. payments given and takes.

BASIC TERM USED IN GAME THEORY

1. Players
2. Two person game/ n- person game
3. Zero sum game / non zero sum game
4 Strategy
(a) Pure strategy
(b)Mixed Strategy
5. Saddle Point

Player: The competitor are referred to as player. A player may be individual a group of individual organisation.

TWO PERSON, ZERO SUM GAME:

A game with only two players in which the gain of one player are the losses of another player, is called a two person zero sum game.

In other words the game in which the algebraic sum of gain and losses of all the players is zero are called zero sum games.

Two person zero- sum games are also called rectangular games as these are usually represented by a pay of matrix in rectangular form.

Pay of Matrix:

In a two – person zero game, the resulting gain, can easily be represented in the form of a matrix, called the pay of matrix or gain matrix.

Strategy and its types

Strategy : it is the pre determined rule by which a player decides his course of action during the game. Generally there are two types of strategies viz. pure strategy and mixed strategy

Pure Strategy: This is a pre determined plan of action based on which games are played which does not game during the game

E.g.: **(A) Rock paper scissors**
Player choose between rock, paper, or scissors, and the winner receives a payoff of +1, while the loser receives a payoff of -1.

(B) Odds and evens
Players simultaneously show one or two fingers, and the player with the matching number of finger wins.

Mixed Strategy : If a player is guessing as to which activity is to be selected by the other on any particular occasion a probabilistic situation is obtained and

objective function is to maximize the expected gain. Thus the mixed strategy is a selection among pure strategies with fixed probabilities.

Saddle Point: A saddle point of a matrix is the position of such an element in the payoff matrix, which is minimum in its row and the maximum in its column.

Thanks

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