TWO PERSONS ZERO-SUM GAMES

This is a most developed part of Game theory which gains popularity among us. When any gain of one rival is offset by the loss of the other, and the net gain sums up to zero, then it is called as zero-sum games.Let us take again the symbolic type of A's payoff matrix, which is as follows:

$$\text{Payoff of matrix of Firm-A} = \begin{bmatrix} G_{11} & G_{12} & G_{13} & G_{14} \\ G_{21} & G_{22} & G_{23} & G_{24} \\ G_{31} & G_{32} & G_{33} & G_{34} \end{bmatrix}$$

Where G_{ij} is A's pyoffs (profits), if A adopt i^{th} strategy and B adopts j^{th} as a counter strategy. Since the game is zero-sum, the corresponding payoff of the firm-B is $-G_{ij}$. Symbolically we can write as,

$$G^{A}{}_{ij} + G^{B}{}_{ij} = 0$$

$$\begin{bmatrix} G_{31} & G_{32} & G_{33} & G_{34} \end{bmatrix}_{3\times 4}$$

Similarly Payoff matrix of firm-B can also be construted depending on the nature of game.

TWO PERSONS CONSTANT-SUM GAMES

The market share of profit or the payoffs of all the players at the end of the game will always add up to a fixed constant. In a constant-sum game, the constant can be any number. Let us take again the Payoff matrix of firm-A which has been taken already as an example.

$$\text{Payoff matrix of firm-A} = \begin{bmatrix} G_{11} & G_{12} & G_{13} & G_{14} \\ G_{21} & G_{22} & G_{23} & G_{24} \\ G_{31} & G_{32} & G_{33} & G_{34} \end{bmatrix}$$

Here each payoff of firm-A is denoted by $G^{A}{}_{ij}$ where 'i' refers to the strategy adopted by A and 'j' to the counter strategy adopted by firm-B, whears the corresponding payoff of the firm-B is $G^{B}{}_{ij}$. Symbolically we can write as follows,

$$G^{A}{}_{ij} + G^{B}{}_{ij} = C$$

Where 'C' is a constant and also it refers to the total market share of profit which is to be distributed between A and B.