

Game Theory

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Abstract

- ▶ Game theory is a mathematical technique that has applications in numerous different fields. Game theory attempts to mathematically and logically determine the best course of action for players in a game to lead to their optimal outcome. In this project, we will be looking at finite two-person zero-sum games as a starting point. This means the interests of the players totally conflict, so if one person gains, the other person loses. These games are sometimes called matrix games because the payoff function of the game can be represented by a matrix.

Outline

- ▶ First, we will go through what game theory is
- ▶ Next, we will discuss matrix games where the payoff function can be represented by

$$A = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & & \vdots \\ a_{m1} & \cdots & a_{mn} \end{bmatrix} \text{ where } a_{ij} = A(x_i, y_j)$$

- ▶ In some cases, solving the game involves finding the saddle point, or some entry a_{ij} such that a_{ij} is the minimum of the i^{th} row and the maximum of the j^{th} column
- ▶ If no saddle point exists, the matrix can be solved by finding equalizing strategies, which we will then go through
- ▶ Lastly, we will discuss some of the applications of game theory, specifically focusing on economics

References

“Game Theory.” 2016. Accessed April 19.

“Game Theory: The Concise Encyclopedia of Economics | Library of Economics and Liberty.” 2016. Accessed April 19.