John Forbes Nash

Equilibrium theory

Biography

- John Forbes Nash, Jr.

Biography

- Nash

Nash Equilibrium

- Nash equilibrium

δ_i denotes the strategy adopted by player i

$\delta = (\delta_1, \ldots, \delta_n)$ denotes the current state

$f_i(\delta) > 0$ denotes the payoff of player i

By asynchronous update, for each i, the minimum of

$$f_i(\delta_i \mid \Lambda_i) = \sum_{j \neq i} \delta_i^T W_{ij} \delta_j$$

is termed as nash equilibrium,

where $\Lambda_i = (\delta_1, \ldots, \delta_{i-1}, \delta_{i+1}, \ldots, \delta_n)$

δ_i belongs the standard basis of R^n

x_i denotes the strategy adopted by player i

$x = (x_1, ..., x_n)$ *denotes the* current state

$f_i(x_1, ..., x_i, ..., x_n) > f_i(x_1, ..., x_i^*, ..., x_n)$ for all $x_i^* \neq x_i$

x is termed as nash equilibrium

	Player 2 adopts strategy A	Player 2 adopts strategy B
Player 1 adopts strategy A	*4, 4*	*1, 3*
Player 1 adopts strategy B	*3, 1*	*3, 3*

A sample coordination game showing relative payoff for player1 / player2 with each combination

	Drive on the Left	Drive on the Right
Drive on the Left	100, 100	0, 0
Drive on the Right	0, 0	100, 100

The driving game

	Option A	Option B	Option C
Option A	0, 0	**25, 40**	5, 10
Option B	**40, 25**	0, 0	5, 15
Option C	10, 5	15, 5	**10, 10**

A Payoff Matrix - Nash Equlibria in bold

	Player 2 chooses '0'	Player 2 chooses '1'	Player 2 chooses '2'	Player 2 chooses '3'
Player 1 chooses '0'	*0, 0*	*2, -2*	*2, -2*	*2, -2*
Player 1 chooses '1'	*-2, 2*	*1, 1*	*3, -1*	*3, -1*
Player 1 chooses '2'	*-2, 2*	*-1, 3*	*2, 2*	*4, 0*
Player 1 chooses '3'	*-2, 2*	*-1, 3*	*0, 4*	*3, 3*

A competition game

- Equilibrium Points in N-Person Games

Game theory

- Nash Equilibrium - Game Theory .net