

Definitions:

- A *fully mixed strategy* for player i is a mixed strategy that assigns positive probability to each action in A_i .
 - A *fully mixed strategy profile* is formed by a fully mixed strategy for each player.
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3 Mixed Nash equilibrium

3.1. Consider the following strategic game:

		Player 2		
		R	S	T
Player 1	A	6,6	2,7	2,6
	B	7,2	3,4	0,0

Determine whether the strategy profile

$(0.6, 0.4), (0.2, 0.4, 0.4)$

is a Nash equilibrium.

- 3.2. Players 1 and 2 each chose a positive integer up to K . If the players choose the same number, then player 2 pays 1€ to player 1 otherwise no payment is done. Each player utility is their corresponding monetary payoff.
- (a) Show that this game has a mixed NE in which each player chooses each positive integer up to K with probability $1/K$.
 - (b) Show that the game has no other mixed NE.

3.3. Consider the two player's game described by the following bi-matrix.

		Player 2	
		A	B
Player 1	C	1,1	4,2
	D	3,3	1,1
	E	2,2	2,3

Find all the NE for the game having a fully mixed strategy profile or show that such Nash equilibria do not exist.

3.4. Compute all the Nash equilibria (pure and mixed) of the following game:

		Player 2	
		A	B
Player 1	A	6,6	2,7
	B	7,2	0,0

3.5. Consider the Cover game (game 1.6). Is a fully mixed strategy profile a NE?

3.6. Given the zero sum game described by the following matrix:

$$A = \begin{pmatrix} 3 & 6 & 5 \\ 5 & 2 & 4 \\ 1 & 0 & 3 \end{pmatrix}$$

find the value of the game and a NE for it.

- 3.7. Two friends play the following game: both players have a sheet of paper. One paper contains the number 7 in red on one side and 3 in black on the other side, the other one 6 in red and 4 in black. They must show at the same time one side of the paper: if the two colors agree the player having 7 and 3 wins the number written in other player's paper. The opposite if the colors disagree. What sheet of paper would you like to have?