5. Represent in the normal form the rock–paper–scissors game (see Exercise 4 of Chapter 2 to refresh your memory) and determine the following best-response sets.

(a) $BR_1(\theta_2)$ for $\theta_2 = (1, 0, 0)$

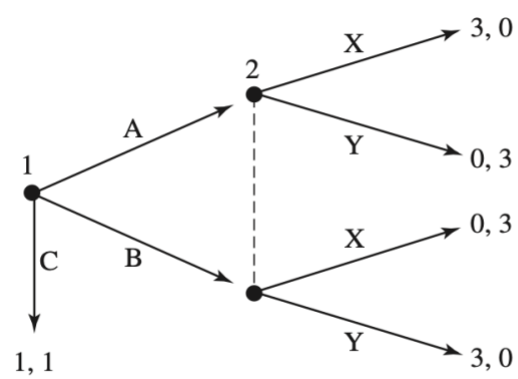
(b) $BR_1(\theta_2)$ for $\theta_2 = (1/6,\ 1/3,\ 1/2)$

(c) $BR_1(\theta_2)$ for $\theta_2 = (1/2,\ 1/4,\ 1/4)$

(d) $BR_1(\theta_2)$ for $\theta_2 = (1/3,\ 1/3,\ 1/3)$

Option b is better.

6. In the game pictured here, is it ever rational for player 1 to select strategy C? Why?



Answer:

x Y

A (3,0) (0,3)

B (0,3) (3,0)

C (1,1) (1,1)

Strategy C for player 1 is dominated by mix of 0.5 A and 0.5 B, this will generate an expected pay off of 1.5. Hence, it is irrational for player 1 to select Strategy C.

EXERCISES

1. Determine the set of rationalizable strategies for each of the following games.

1 \ 2	X	Y
U	0, 4	4, 0
M	3, 3	3, 3
D	4, 0	0, 4

(a)

1 \ 2	X	Y	Z
U	2, 0	1, 1	4, 2
M	3, 4	1, 2	2, 3
D	1, 3	0, 2	3, 0

(b)

Answers:

b. Here, two sets (U,Z) and (M,X) are coming to be dominant for player 2 and 1 respectively. For player 1 strategy set D is dominated by mix strategy of U and M, which eliminates D and leaves us with U,M,X,Z. So, the rationalizable strategy set is: (U,X) , (U,Z), (M,X) and (M,Z).

7. Consider a guessing game with ten players, numbered 1 through 10. Simultaneously and independently, the players select integers between 0 and 10. Thus player i's strategy space is $S_i = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, for $i = 1, 2, \ldots, 10$. The payoffs are determined as follows: First, the average of the players' selections is calculated and denoted a. That is,

$$a = \frac{s_1 + s_2 + \cdots + s_{10}}{10},$$

where s_i denotes player i's selection, for $i = 1, 2, \ldots, 10$. Then, player i's payoff is given by $u_i = (a - i - 1)s_i$. What is the set of rationalizable strategies for each player in this game?

Each participant is given a number between 0 and 10 to choose from, and their decision is made independently of the others.

As a result, it's possible that they all picked the same number. Now take a close look at the case.

The compensation is provided by the

$$u_i = (a - i - 1)s_i.$$

he maximum value of a = 10 (when all choses 10)

and minimum value = 0 (when all choses 0) Now for player 10，

ui = (a-11)^s_i

which is going to be negative. So player 10 chose zero.

But for player 9 keeping in mind that player 10 is rational will chose zero so as to aviod , a-10<0

(as 10th player choses 0 so max value of a is 9 thus (a-9-1) can be made non negative if player 9 choses zero)

Thus this will continue for all players and the selection is 0