HW 7.7

Friday, September 18, 2020 1:14 PM

Passed Solution review

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?

Max $a = 100/10 = 10$
Min $a = 0/10 = 0$

Max $U = a - 10 - 1 = a - 11$ → negative
Min $U = a - 1 - 1 = a - 2$ → maybe negative

If everyone chooses 0, Final payoff is non-negative

$a \leq 10$ so $a - 10 - 1 \leq -1$ so $s_{10} = 0$ dominates
Now $a \leq 9$ so $s_9 = 0$ dominates
Now $a \leq 8$ so $s_8 = 0$ dominates

and so on...

$S = (0, 0, \ldots, 0)$