Problem Set 2: Zero-sum and Non-Zero Sum Games (2021)

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1.

a. Starting with the non-zero sum games shown simplify the games as much as possible using dominant row/column simplification.

i.

Row/Column	I	II
1	(1,3)	(2,1)
2	(5,6)	(0,4)
3	(-1,3)	(1, -3)

ii.

Row/Column	I	II	III
1	(1, 4)	(-4, 3)	(3,1)
2	(0,-1)	(3,0)	(-2, -1)

b. If the games above have more than a single cell after the simplification, construct the motion diagram associated with the simplified game. Based on

the motion diagram, what advice might you give to the players of the game?

2. For each zero-sum game below (payoffs from Row's point of view), a. Draw a motion diagram for the game b. Determine if the game can be simplified using dominant row/column analysis c. Determine the "stable points" of the game if any.

i.

Row/Column	I	II	III	IV
1	12	-1	1	0
2	5	1	7	-19
3	3	2	4	3
4	-15	0	0	11

ii.

Row/Column	I	II	III	IV
1	4	2	7	2
2	2	1	-2	-22
3	3	2	4	2
4	-13	0	16	1

2. (Required for doctoral students; extra-credit for others) For the game below determine the mixed strategy value of the game in terms of the letters a, b, c, and d, which are all positive. What percentage of the time should Row play Row 2 when playing optimally?

Row/Column	I	II
1	-a	d
2	c	-b