Game Theory Overview (28/5/21)

Q1 [14 marks]

(i) The following pay-off matrix is for a zero-sum game (from player 1's point of view).

Player 2: Player 1	A	B	C	D
A	4	3	2	0
B	3	3	-1	-2
C	-2	2	3	1

Use the idea of dominance to reduce the matrix as much as possible. [4 marks]

(ii) Identify the play-safe strategies for players 1 and 2. Explain whether or not there is a stable solution. [5 marks]

(iii) What will be the outcome of the game if:
(a) both players play safe
(b) player 1 plays safe, and player 2 hears of player 1's intention
(c) player 2 plays safe, and player 1 hears of player 2's intention

[5 marks]

Q2 [12 marks]

A zero-sum game is given by the following pay-off matrix (from player 1's point of view). Confirm that there is no stable solution, and find the optimal mixed strategy for each player, and their expected pay-offs.

Player 2: Player 1	A	B
A	2	3
B	4	-1

Q3 [22 marks]

A zero-sum game is given by the following pay-off matrix (from player 1's point of view).

Player 2: Player 1	A	B	C
A	1	-2	2
B	3	4	-1

(i) Confirm that there is no stable solution, and find the optimal mixed strategy for player 1, and their expected pay-off.
[12 marks]

(ii) By using the fact that the expected pay-off for player 2 will equal $-1 \times$ the expected pay-off for player 1, find the optimal mixed strategy for player 2. [10 marks]