

## Game Theory - Exercises (2 pages; 16/8/19)

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

Player 2:	A	B	C	D
Player 1				
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.

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

(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

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

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

Player 2:	A	B	C
Player 1			
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.

(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.