

**UGEB2530 Game and strategic thinking**  
**Assignment 2**

Due: 9 Feb 2015 (Monday)

1. Copy the following game matrices and circle all saddle points of the matrix

(a) 
$$\begin{pmatrix} -3 & 5 & -1 & 0 \\ -1 & -3 & 5 & -2 \\ 2 & 4 & -1 & 1 \end{pmatrix}$$

(b) 
$$\begin{pmatrix} -3 & 5 & -3 & 0 \\ 1 & 3 & 6 & 4 \\ 0 & -4 & -1 & -3 \\ -2 & 2 & 3 & 1 \end{pmatrix}$$

2. Solve the zero sum games, that is, find a maximin strategy for the row player, a minimax strategy for the column player and the value of the game, with the following game matrices.

(a) 
$$\begin{pmatrix} 3 & -1 \\ 0 & 1 \end{pmatrix}$$

(b) 
$$\begin{pmatrix} -2 & 5 \\ 4 & 1 \end{pmatrix}$$

3. Solve the zero sum games with the following game matrices.

(a) 
$$\begin{pmatrix} 1 & -1 & 3 \\ 3 & 5 & -3 \end{pmatrix}$$

(b) 
$$\begin{pmatrix} -1 & 6 \\ 0 & 5 \\ 2 & 3 \\ 3 & 1 \end{pmatrix}$$

4. Solve the zero sum game with game matrix 
$$\begin{pmatrix} 5 & 3 & 8 & 1 \\ 2 & 3 & 5 & 10 \\ 7 & 5 & 6 & 2 \\ 6 & 4 & 3 & 1 \end{pmatrix}$$

5. Let

$$A = \begin{pmatrix} -3 & 1 \\ a & -2 \end{pmatrix}$$

where  $a$  is a real number.

- (a) Find the range of values of  $a$  such that  $A$  has a saddle point.
- (b) A zero sum game is a fair game if its value is zero. Suppose the zero sum game with game matrix game is a fair game.
- (i) Find the value of  $a$ .
- (ii) Find the maximin strategy for the row player and the minimax strategy for the column player.