MP305 Practical 2017/2018 – Game Theory

Open up the Maple worksheet `game.mw`.

This file may be downloded from the **MP305 Blackboard** web page.

Notice
Solutions to the questions marked with **(*)** has to be shown (and explained) to the instructor at the practicals in order to get 3% that count towards the overall mark.

1. **(*)** Analyse the following matrix games and determine whether or not a saddle point solution exists.

   (a)

	B_1	B_2
A_1	1	2
A_2	0	-2

   (b) The two coin game:

	B_1	B_2
A_1	1	-1
A_2	-1	1

   (c)

	B_1	B_2	B_3	B_4
A_1	1	2	4	0
A_2	0	-2	-3	4

   (d)

	B_1	B_2	B_3	B_4
A_1	1	0	4	1
A_2	-1	-4	-3	4

   (e) The game of "odd-even":

	B_1	B_2	B_3
A_1	0	2	-1
A_2	-2	0	3
A_3	1	-3	0

   (f)

	B_1	B_2	B_3	B_4
A_1	0	13	-5	1
A_2	-13	0	8	-12
A_3	5	-8	0	6
A_4	-1	12	-6	0

2. (*) Analyse the previous games using mixed strategies

   (a) In the cases where A has two strategies A_1 and A_2 are chosen with probabilities p and $1-p$, respectively, find the maximum over p of the minimum payoff against each strategy B_i by diagrammatic means.

   (b) Find the optimal mixed strategy in general.

   (c) Verify in general that the optimal strategies for A and B are identical for a symmetric game, i.e. a game where the pay-off matrix is anti-symmetric