MTH5114 Linear Programming and Game Theory, Spring 2024

Week 10 Coursework Questions   Viresh Patel

These exercises should be completed individually and submitted (together with those of weeks 8 and 9) via the course QMPlus page by **9am on Tuesday, 09 April**.

Make sure you clearly write your **name** and **student ID** number at the top of your submission:.

1. Consider the following 2 player, zero-sum game. The row and column player each have 3 cards labelled 1, 2, and 3. Both players select a card, and then they simultaneously reveal their selected cards. The player with the highest numbered card wins. The loser pays the winner an amount equal to the number on the winner's card. If the number on both players' cards is the same, neither player wins or loses anything.

   Give the payoff matrix for this game (from the perspective of the row player) and identify any Nash equilibria that the game has.

2. Give an example of a 2-player, zero-sum game with the following properties (by giving its payoff matrix from the perspective of the row player):

   - The row player has strategy set $\{r_1, r_2\}$ and the column player has strategy set $\{c_1, c_2\}$
   - The security levels of r_1, r_2, c_1, and c_2 are respectively -1, -2, 4, and 3.