Mathematical Introduction to Game Theory

Assignment 4, due October 18

Problem 1 of 5. Solve the following zero-sum game, i.e. find the value of the game and all optimal strategies for both players

$$\begin{pmatrix} 0 & 1 \\ 2 & -1 \\ -1 & 2 \\ 1 & 0.5 \end{pmatrix}.$$

Problem 2 of 5. Solve the following zero-sum game, i.e. find the value of the game and all optimal strategies for both players

$$\begin{pmatrix} 2 & 3 & -2 & 1 \\ -2 & -3 & -2 & 2 \\ -2 & -5 & 0 & -2 \\ -1 & 1 & 1 & 1 \end{pmatrix}.$$

Problem 3 of 5. Find an optimal strategy for Ruth and the value of the game with the matrix

$$\begin{pmatrix} 0 & 1 & -1 & 1 \\ -1 & 0 & 1 & 1 \\ 1 & -1 & 0 & 1 \\ -1 & -1 & -1 & 0 \end{pmatrix}.$$

Problem 4 of 5. Solve the following zero-sum game, i.e. find the value of the game and all optimal strategies for both players

$$\begin{pmatrix} 1 & -2 & 2 & 0 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 1 & -2 \\ 0 & 0 & 0 & 1 \end{pmatrix}.$$

Problem 5 of 5. Prove that the set of all optimal strategies of Ruth (or Chris) in any finite zero-sum game is convex.