

MAT406H5F. Assignment 3, due October 5

Problem 1 of 5

Consider a zero-sum game with the matrix

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

Find Chris' optimal response to the $(\frac{1}{2}, \frac{1}{4}, \frac{1}{4}, 0)$ strategy of Ruth.

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

$$\begin{pmatrix} 1 & 2 \\ 4 & 1 \end{pmatrix}.$$

Problem 3 of 5

Consider a zero-sum game with the matrix

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

where a is a parameter. For which values of a does the game have saddle point?

Problem 4 of 5

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

$$\begin{pmatrix} 1 & 1 & 2 & 1 \\ 0 & 0 & 2 & 0 \\ 1 & 1 & 5 & 8 \\ 2 & 1 & 0 & 3 \end{pmatrix}.$$

Problem 5 of 5

Find all the values of x for which the game with the matrix

$$\begin{pmatrix} -x & 2 \\ -1 & x \end{pmatrix}$$

has a strictly positive value.