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Section H J
Subsection left center right
Row number 1 2 3 4 5 6 7 8

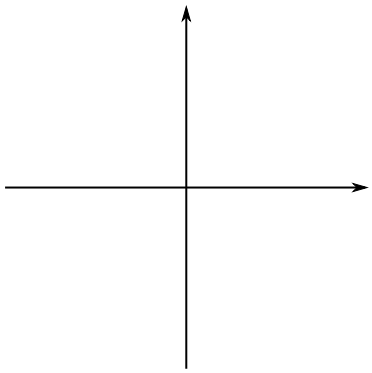
Mathematics 1553

Written Homework 3
Prof. Margalit
5 February 2016

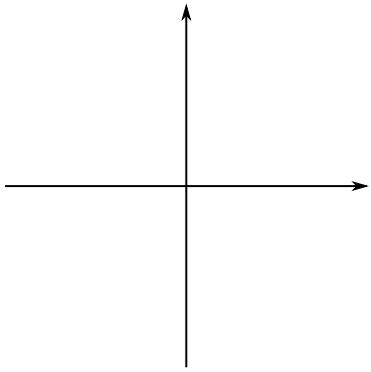
1. Consider the matrix

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

Find all b so that $Ax = b$ is consistent. Plot the set of such b. Explain your answer.

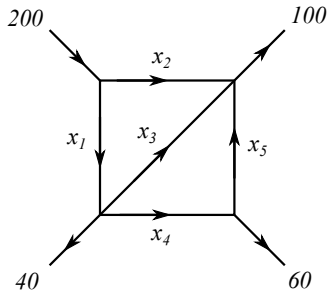


Plot (and label) the set of solutions to $Ax = 0$. Choose a nonzero b so that $Ax = b$ is consistent and plot (and label) the solutions to $Ax = b$



Is there a vector b in $\mathbb{R}^2$ so that the solutions to $Ax = b$ is the line $x + y = 6$? If so, find such a b; if not, explain why not.

2. The traffic in the town square is described by the following diagram (The arrows indicate the directions of one way streets and the labels indicate the number of cars per hour).



Write down a system of linear equations that describes the flow of traffic in the town square.

Write down the corresponding augmented matrix and find its reduced row echelon form.

What is the parametric form of the solution to the linear system?

What will be the traffic on each street if the street labeled x_4 is closed for construction?

What if instead the street labeled x_1 is closed for construction? How can traffic be rerouted? (You may need to change the directions of some one way streets.)