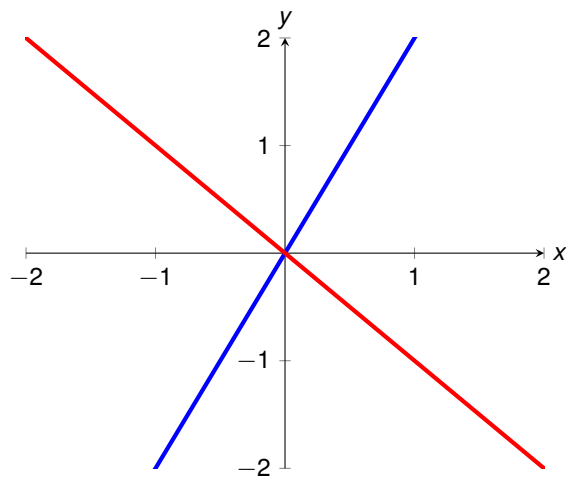

Exercise 1 Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be a linear transformation induced by some matrix A . The sketch below shows two lines. Suppose the following:

- when transformation T is applied to vectors along the line $y = 2x$, the vectors reverse direction, but keep their lengths.
- when transformation T is applied to vectors along the line $y = -x$, the vectors keep their direction, but triple in length.



Find the eigenvalues of A .

Eigenvalues of A (in increasing order): $\lambda_1 = \dots$, $\lambda_2 = \dots$

Find a basis for the eigenspace associated with each of these eigenvalues.

A basis for S_{λ_1} : $\left\{ \begin{bmatrix} 1 \\ \dots \end{bmatrix} \right\}$

A basis for S_{λ_2} : $\left\{ \begin{bmatrix} 1 \\ \dots \end{bmatrix} \right\}$