

MA 490/590 Homework 9

due Wednesday, 4/2

1. For each of the matrices below, let $T(u) = Bu$. Draw invariant curves for T and mark the orbit of a point (x, y) with $x > 0$ and $y > 0$.

(a) $B = \begin{pmatrix} -2 & 0 \\ 0 & 3 \end{pmatrix}$

(b) $B = \begin{pmatrix} 3 & 0 \\ 0 & -1/2 \end{pmatrix}$

(c) $B = \begin{pmatrix} 1/\sqrt{2} & 1/\sqrt{2} \\ -1/\sqrt{2} & 1/\sqrt{2} \end{pmatrix}$

(d) $B = 2 \begin{pmatrix} 1/\sqrt{2} & -1/\sqrt{2} \\ 1/\sqrt{2} & 1/\sqrt{2} \end{pmatrix}$

2. For the matrix $A = \begin{pmatrix} 3 & 2 \\ 1 & 1 \end{pmatrix}$

(a) Find A^{-1} ;

(b) Find the eigenvalues of A ;

(c) Find $A \begin{pmatrix} 1 \\ 0 \end{pmatrix}$, $A \begin{pmatrix} 0 \\ 1 \end{pmatrix}$, $A \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ and draw the picture for the action of A on \mathbb{T}^2 similar to the one on p. 202.