

More with Eigenvalues/vectors

Linear Algebra

College of the Atlantic

1. Consider the matrix

$$A = \begin{bmatrix} -5 & 6 \\ -3 & 4 \end{bmatrix} \quad (1)$$

- (a) Find the eigenvalues of A .
- (b) Find the eigenvectors corresponding to the eigenvalues you just found.
- (c) Could a 2×2 matrix ever have more than two different eigenvalues? Why or why not?
- (d) Do the the two eigenvectors \vec{v}_1 and \vec{v}_2 form a basis for \mathbb{R}^2 ?
- (e) Suppose you have a vector \vec{x} and you'd like to express it in the eigenbasis $\{\vec{v}_1, \vec{v}_2\}$. What matrix would you use to accomplish this task?

2. Now consider the matrix: Consider the matrix

$$S = \begin{bmatrix} 0.4 & 0.3 \\ 0.6 & 0.7 \end{bmatrix} \quad (2)$$

- (a) This matrix has an eigenvalue of $\lambda_a = 1$. Find the eigenvector corresponding to this eigenvalue.
- (b) By hand, determine the reduced row echelon form of $B - \lambda_1 I$.