

Chapter 6.2

Linear Algebra with applications to differential equations

College of the Atlantic. Winter 2019

1. (Re)introduce yourself to your partners and briefly share a highlight from last week. .
2. Consider the following matrix:

$$A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}. \tag{1}$$

- (a) Find the eigenvalues and eigenvectors for A .
- (b) Let P be the eigenvector matrix. Find P^{-1} .
- (c) Calculate $P^{-1}AP$. Is the answer what you expected?
- (d) Do your eigenvectors span \mathbb{R}^2 ?
- (e) Are your eigenvectors linearly independent?
- (f) Do your eigenvectors form a basis for \mathbb{R}^2 ?

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3. Consider the matrix:

$$A = \begin{bmatrix} 0.85 & 0.10 \\ 0.15 & 0.90 \end{bmatrix}. \tag{2}$$

Find its eigenvectors and eigenvalues, and matrices P and P^{-1} . Don't use decimals or a calculator. Fractions and a bit of cleverness will lead to a tidy result.