

Homework 7, Math 3000

due on March 15, 2022

Before you start, please read the syllabus carefully.

1. Compute the determinant of the following matrices.

(a)

$$A = \begin{pmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \end{pmatrix}$$

(b)

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 1 \\ 3 & 1 & 1 \end{pmatrix}$$

(c)

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 2 & 1 \end{pmatrix}$$

2. Compute the eigenvalues and eigenvectors for the following matrices.

(a)

$$A = \begin{pmatrix} 3 & 2 \\ 4 & 3 \end{pmatrix}$$

(b)

$$A = \begin{pmatrix} 1 & 5 \\ 5 & 1 \end{pmatrix}$$

(c)

$$A = \begin{pmatrix} 1 & 5 \\ 0 & 1 \end{pmatrix}$$

(d)

$$A = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 1 & -1 \\ 0 & -1 & 1 \end{pmatrix}$$

(Hint: $\lambda = 1$ is an eigenvalue.)