Homework Assignment

Due: 11:55pm, Monday, March 4

1. (40 points)

Find the eigenvalue and eigenvectors of the following matrix by hand:

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

Include the detailed calculation procedure in your solution and verify your results using Python.

2. (60 points)

Suppose $S = \{v_1, v_2, \cdots, v_n\}$ is an *orthonormal* basis for $\mathbb{R}^n$. Then we can write any vector v as

$$v = \sum_{i=1}^{n} c_i v_i$$

for some constants $v_i, i = 1, 2, \cdots, n$. Find a formula for the constants in terms of S.