

MATH 3110 - Fall 2014

Homework 11

Due: Thursday November 20

Questions. Chapter 6.2 and 6.4 of Strang

(total of 20 marks)

1. Give two matrices with eigenvectors $v_1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ and $v_2 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$. (4 marks)

2. Compute A^{10} for $A = \begin{pmatrix} 3/4 & -1/4 & 1/4 \\ 0 & 1 & 0 \\ 1/4 & 1/4 & 3/4 \end{pmatrix}$. (5 marks)

3. Compute e^A for $A = \begin{pmatrix} -3 & -2 & -1 \\ 6 & 4 & 2 \\ 4 & 2 & 2 \end{pmatrix}$. (5 marks)

4. (a) Find an orthogonal matrix Q that diagonalizes $A = \begin{pmatrix} -2 & 6 \\ 6 & 7 \end{pmatrix}$. What is Λ ? (6 marks)

(b) Find all orthogonal matrices that diagonalize $A = \begin{pmatrix} 9 & 12 \\ 12 & 16 \end{pmatrix}$.