

## Math 19620/20 Homework 9

Due: Wednesday, December 5, 2018, at **5:00pm** in my mailbox in the basement of Eckhart (You can also give it to me in class on Tuesday if you prefer.)

Please present your solutions clearly and in an organized way. Think of it this way: if you show it to another student in this class, he/she should be able to understand it without needing to ask you questions.

### November 27

Goals:

- Understand the definition of eigenvector and eigenvalue
- Use eigenvectors and eigenvalues to study dynamical systems, draw phase portraits.

**Exercises 7.1:**

- 1, 2, 3, 4
- 30, 31, 32 (Take a look at Figure 10 on page 323.)
- 67

### November 29

Goals:

- Find eigenvalues and eigenvectors of a matrix.
- Evaluate  $A$  raised to a power by diagonalizing  $A$ .

**Exercises 7.1:**

- 68 () , 69

**Exercises 7.3:**

- 1, 3, 5, 7, 9, 15 (please do by hand)

**Exercises 7.4:**

- 7, 21 (Even though we didn't talk about this section, I covered enough in class that you can do these problems.)

**Extra question: (please turn in)**

- Take a look at Section 2.1, Example 9 (pages 51-53). The vector they call  $\vec{x}_{equ}$  is an eigenvector of some matrix in the section. Which matrix is it, and what is the eigenvalue of  $\vec{x}_{equ}$ ? (Please red through that example before Tuesday. It will be useful in the final lecture!)

**That is all! No more linear algebra homework problems ever again after this!**  
(But don't forget that you still have the final exam.)