Matrices & Linear Algebra I
C Term, Sections C01-C04
W. J. Martin
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Week 8: Reading and Exercises

Reading

There are plenty of cool things to read about in the textbook. For example, Chapters 2 and 9 discuss some nice applications of what we've learned. But let's be practical and focus on just what is needed in order to do well on the last test. We probably need to read Sections 8.1 and 8.2 again so that we understand the basic ideas related to eigenvalues. Please also read Section 8.3. Since we did not cover the Gram-Schmidt procedure, we can only diagonalize symmetric matrices without repeated eigenvalues.

Practice Exercises

NOTE: Do not hand in.

Find all eigenvalues and eigenvectors for each of the following matrices.

1. $\begin{bmatrix} 4 & 0 \\ -1 & -1 \end{bmatrix}$

2. $\begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix}$

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

4. $\begin{bmatrix} 22 & 8 & -22 \\ -6 & -1 & 6 \\ 18 & 7 & -18 \end{bmatrix}$

5. $\begin{bmatrix} 0 & 0 & 0 & 0 \\ 1 & -5 & -9 & 15 \\ 5 & -2 & -2 & 5 \\ -4 & -4 & -6 & 11 \end{bmatrix}$

6. $\begin{bmatrix} 3 & 2 & 2 & -3 \\ 2 & 3 & -3 & 2 \\ 2 & -3 & 3 & 2 \\ -3 & 2 & 2 & 3 \end{bmatrix}$