Problems from H&S Chapter 3, Section 3

It’s time to start to get ready to Rock and Roll

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From H&S, Chapter 3, §3, Pages 54-55:

Problem 1: This is sort of an exercise. You have a partial answer in the back of the text.

Problem 2: Similarly, more of an exercise, but one not often seen in other texts.

Problem 3: This can be done independently of the text’s exposition. The technique suggested in the hint is a common one, and is similar to what is done in Chapter 8, §4.

Problem 5: A good problem, but terribly phrased. The preamble to the problem states that $A$ is an $n \times n$ matrix with real, distinct eigenvalues, but in part (b), $A$ is a real constant. Certainly, these two entities are related, but they cannot be the same thing. Part of this problem is to find the constant $k \geq 0$ based on what you know about the matrix $A$.

Problem 6: This is sort of crucial to what we do in 18.03(4) as opposed to “regular” 18.03, especially since we’re using this text. That is, we’ve done a lot of work so far, but have only come close to considering the equation (*). For part (c), you are indeed expected to make three different graphs. You are welcome and encouraged to use your favorite graphing program. Details upon request.

Problem 7: Take a look at this, recalling that the term “phase portrait” was introduced way back on Page 4. What I would like to do is to go over this (and, of course, any other problems) in class on Friday April 11, between batches of spaghetti and butterscotch brownies.