

Differential Equations – Homework 15

Professor:

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Homework 15

This class follows Chapter 3.8 in our book.

Next class we are skipping back to Chapters 3.4 Mechanical Vibrations and 3.6 Forced Oscillations. This is a chance to take a break from new methods and see that our ODEs really do have physical meaning.

Directions: Do the following book problems

Chapter 3.8 Problems: 1, 2, 4, 12, 13

Other Notes:

1. I would suggest always checking all three cases for λ until you feel really comfortable with the logic here. Just go through and convince yourself about whether or not nontrivial solutions exist.
2. Usually you will be able to show, or prove, that there are no negative eigenvalues. However there are many cases where you get the $\lambda = 0$ repeated root case to give you a non trivial solution.
3. You should always get $\lambda > 0$ imaginary root cases to work.
4. Sometimes your cases are slightly different. For example in number 13 you are testing $\lambda < 1$, $\lambda = 1$, and $\lambda > 1$ and this changes your results quite a bit. Do the math carefully for the characteristic equation so see that this is true.