

Differential Equations Test II Overview

As always your first best line of defense is to complete and understand the Problem Set, Practice Homework and lecture examples. I should mention that I have integrated a number of old test questions into the lecture notes.

1. be able to carefully define linear independence of a set of functions over an interval of real numbers.
2. What does the Wronskian tell us about linear independence ?
3. Be able to solve n-th order nonhomogeneous constant coeff. ODEs with or without initial conditions. (See homeworks from 4.4,4.5,4.6,6.3,6.4)
4. When can you use the method of undetermined coefficients, what is it good for ? (Section 6.3 really answers this, but 4.4,4.5 give many examples)
5. Be comfortable and conversant in the operator notation for linear ODEs. Be able to quickly and confidently transfer between the prime notation and the big D notation. Why do I care about operators?
6. When is the homogeneous solution the general solution ?
7. What is the particular solution, how do you form the general solution ?
8. When is the method of variation of parameters useful ? What does it give you ? (See homeworks from 4.6) I plan to give you the basic formulas for variation of parameters, it's upto you to interpret them correctly.
9. How can we find the annihilator of a function ? (see section 6.3)
10. What does the annihilator method help us remember ? (see section 6.3)
11. What does the annihilator method not do ? *It doesn't find the specific values of the undetermined coefficients, you have to work out the algebra to do that, the annihilator method just helps us select the correct form of y_p* (see section 6.3)
12. What is the principle of superposition ? What kind of DEqn does it hold for ?
13. What is a variable coefficient linear ODE? I will suggest the form of the solution if I were to put a Cauchy Euler problem on the test. You are not expected to memorize the general algorithm for solving a Cauchy-Euler problem.
14. Be able to solve and analyze springs with or without damping and forcing function (see 4.9-4.10). I do not expect you to memorize the formula for γ_r , however, I might ask you to derive it from first principles.