

The exam will cover all material taught from Chapter 3 as well as Chapter 2.2 sections 2, 3, 4, 5. Material from Lab 1 will also be covered. Here are some study ideas.

- How do you solve a linear second order (possibly not constant coefficient) homogeneous equation?
- What's a Wronskian? What's it good for?
- How do you solve a linear second order (possibly not constant coefficient) **non-homogeneous** equation?
- Understand the principle of superposition in its several forms.
- How do you solve second-order linear constant-coefficient equations?
- Know how to use the method of undertermined coefficients (i.e. method of clever guesses).
- Know the difference between underdamped, overdamped, and critically damped mass-spring systems.
- What are the steps of using Euler's method? Improved Euler's method?
- Can you graphically show what the steps of using Euler's method and improved Euler's method are?
- How fast does the error go to zero when using Euler's method?
- For the two harvesting schemes on the lab, what values of the parameters allow extinction?
- Know what the time-series (i.e. solution curves) look like for the two different harvesting schemes and for various parameters.
- Be able to non-dimensionalize an equation (nothing too hard here; e.g. I might tell you what to use for dimensionless variables).
- Be able to solve first order differential equations relating to air resistance.