

3450:335 Ordinary Differential Equations, Kreider
Exam 2 Preparation

The exam is scheduled for Monday 5 November. There are 10 problems on the exam. You will not need a calculator, but you may bring one as a security blanket.

The topics covered on the exam are:

- Reduction of Order, section 4.2 (**Formula will be given**)
- Homogeneous Constant Coefficient Equations, section 4.3
- Undetermined Coefficients, section 4.4
- Variation of Parameters, section 4.6
- Cauchy-Euler Equations, section 4.7
- Spring-Mass Systems, section 5.1
- Linear Systems of Homogeneous Equations, section 8.2 (**Repeated roots formula will be given**)

Formulas you need to know are:

- 3 cases for complementary solutions for constant coefficient equations
- undetermined coefficient forms
- variation of parameter formulas
- 3 cases for complementary solutions for Cauchy-Euler equations
- solution form for systems with distinct eigenvalues

For spring-mass systems, you should know

- how to classify the solution to an undriven system as overdamped, underdamped or critically damped by looking at the structure of $x_1(t)$ and $x_2(t)$
- how to recognize the transient and steady state components for a driven system with damping
- how to recognize whether an undamped driven system displays resonance from the ODE or the structure of the solution
- how to set up and solve a typical problem