To do List

1. Check solutions to worksheet 03/27
2. Watch video on the variation of parameters for the general second order problems and take detailed notes.
3. Attempt problem 1 below.
4. Watch the video on modeling the spring-mass system and take detailed notes
5. Attempt problem 2 below.

NOTE: I will not collect the worksheet problems. These problems are meant to check your understanding and generate questions to ask me during office hours if you get stuck.

Objectives

By the end of this lecture you should be able to

1. Use the variation of parameters technique to find a particular solution of a second order non-homogeneous ODE with non constant coefficients given a fundamental set of solutions.
2. Understand how a second order ODE with constant coefficients describes the motion of a spring-mass system.

Problems

1. Find the general solution of

\[ t^2 y'' - 3ty' + 4y = t^2 \ln(t) \]

give that \( y_1(t) = t^2 \) and \( y_2(t) = t^2 \ln(t) \) satisfy the homogeneous problem.

2. A mass of \( \frac{1}{2} \) is attached to a spring with spring constant \( k = 2 \frac{kg}{s^2} \). The spring is pulled down an additional 1m and released. Find the equation of motion if the damping constant is \( \gamma = 2 \frac{kg}{s} \).

Additional Reading/ Examples

Section 3.6 pages 143 -146