

Homework II

1. Find the general solution $x(t)$ of the equation of

$$x'' + 2x' + 5x = 0$$

using the damp oscillation formula we gave in class.

2. Solve the equation of

$$x'' + 4x' + 3x = 0$$

And initial conditions: $x(0) = 1, x'(0) = 0$.

3. First consider the homogeneous ODE:

$$\frac{d^2x}{dt^2} + 3\frac{dx}{dt} + 3x = 0$$

A. Find the general solutions x_h of this ODE.

B. Consider the inhomogeneous ODE:

$$\frac{d^2x}{dt^2} + 3\frac{dx}{dt} + 3x = 12e^{-2t}$$

Find one solution. Hint: $x \propto e^{-2t}$ would work.

C. Find the general solutions x_{inh} of the inhomogeneous ODE.

D. Assume the initial condition $x(0) = 0, \frac{dx}{dt}(0) = 0$, find the solution $x(t)$.