

## MATH 2070 HOMEWORK 5

1. Find the general solutions to the following ODEs

(a)  $y'' - 2y' + 2y = 0$

(b)  $y'' + 2y' + 2y = 0$

(c)  $y'' + 25y = 0$

(d)  $4y'' + 16y' + 25y = 0$

(e)  $4y'' - 20y' + 25y = 0$

(f)  $y'' - 6y' + 9y = 0$

2. Find the solutions to the following IVPs and state if the solution is growing, steady or decaying

(a)  $y'' + 4y = 0, y(0) = 0, y'(0) = 1$

(b)  $y'' - 4y' + 5y = 0, y(0) = 3, y'(0) = 0$

(c)  $y'' + 4y' + 5y = 0, y(0) = 3, y'(0) = 0$

3. Find the solutions to the following parameterized IVPs and determine the critical value of  $\alpha$  when the long term behavior changes

(a)  $y'' - 3y' - 4y = 0, y(0) = \alpha, y'(0) = 2$

(b)  $y'' - 4y' + 4y = 0, y(0) = 1, y'(0) = \alpha$