

5.2 Constant Coefficient Homogeneous Equations

4/2/23

Ken Mei Test #2 Review Assignment #1

Text book: Page 217 or PDF Pg 227

$$2) y'' - 4y' + 5y = 0$$

$$r = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$r^2 - 4r + 5 = 0$$

$$a=1, b=-4, c=5$$

$$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(5)}}{2(1)} = \frac{4 \pm \sqrt{16 - 20}}{2}$$

$$\frac{4 \pm \sqrt{-4}}{2} = \frac{\lambda + w i}{2 \pm 2i}$$

$$r_1 = \lambda + w i, r_2 = \lambda - w i$$

$$r_1 = 2 + 2i, r_2 = 2 - 2i, \lambda = 2, w = 2$$

$$y_1 = e^{\lambda x} \cos(wx), y_2 = e^{\lambda x} \sin(wx)$$

$$y_1 = e^{2x} \cos(2x), y_2 = e^{2x} \sin(2x)$$

General Solution:

$$A e^{2x} \cos(2x) + B e^{2x} \sin(2x)$$