Actividad semana 4

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

1) $y'' + 10y' + 26y = 0$

$r^2 + 10r + 26 = 0$

$a = -5 \quad b = i$

$y = e^{ax}[c_1 \cos bx + c_2 \operatorname{sen} bx]$

$y = e^{-5x}[c_1 \cos x + c_2 \operatorname{sen} x]$

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

$y = c_1 e^{rx} + c_2 x e^{rx}$

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

$(r+2)^2 = 0$

$r_1 = 2$

$r_2 = 2$

$y = c_1 e^{-2x} + c_2 x e^{-2x}$

3) $y'' - 2y' - 8y = 0 \quad y(0) = 2 \quad y'(0) = -16$

$y = c_1 e^{r_1 x} + c_2 e^{r_2 x}$

$r^2 - 2r - 8 = 0$

$r_1 = 4$

$r_2 = -2$

$y = c_1 e^{4x} + c_2 e^{-2x}$

$y' = 4c_1 e^{4x} - 2c_2 e^{-2x}$

$2 = c_1 + c_2$

$-16 = 4c_1 - 2c_2$

$4 = 2c_1 + 2c_2$

$-12 = 6c_1$

$c_1 = \frac{-12}{6} = c_1 = -2$

$2 = -2 + c_2$

$c_2 = 4$

$c_1 = -2$

$y = -2e^{4x} + 4e^{-2x}$

3. $y'' + 8y' + 16y = 0$

$y = C_1 e^{-4x} + C_2 x e^{-4x}$

4. $y'' - 5y' + 4y = 0$

$y = C_1 e^{4x} + C_2 e^{x}$

6. $y'' + 2y' + 26y = 0 \quad y(0) = 3 \quad y'(0) = -18$

$y = e^{-x}[C_1 \cos 5x + C_2 \operatorname{sen} 5x]$

$3 = C_1 +$

$C_1 = 3$

$u = C_1 e^{-x} \qquad v = \cos 5x$

$du = -C_1 e^{-x} \qquad dv = -5 \operatorname{sen} 5x$

$-u = C_2 e^{-x} \qquad v = \operatorname{sen} 5x$

$du = -C_2 e^{-x} \qquad dv = 5 \cos 5x$

$y' = -C_2 e^{-x} \sin 5x - 5C_1 e^{-x} \sin 5x + 5C_2 e^{-x} \cos(5x) - C_1 e^{-x} \cos 5x$

$-18 = 5C_2 - C_1$

$-18 = 5C_2 - 3$

$-15 = 5C_2$

$C_2 = -3$

$y = e^{-x}[3 \cos 5x - 3 \operatorname{sen} 5x]$

7. $16y'''' + 24y'' + 9y = 0$