Announcements

1) Math Major Pizza/+-shirt event in Math Library (CB 2047) From noon to 1:30 on Monday Exam | Thursday next \mathcal{I}

week, review on Tuesday

F and g, defined on an interval I, are said to be linearly dependent if there is a real number C such that

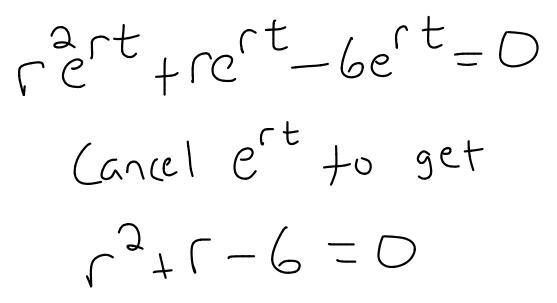
f(x) = cg(x)

for all X in I.

Example 1: (distinct routs)

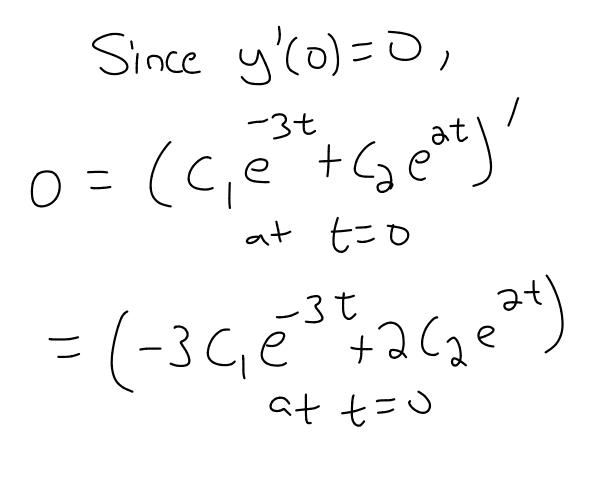
Solve y"(t) + y'(t) - 6 y(t)=0, y(0) = 1, y'(0) = 0.Suppose y(t) = ert for Some C.

Then again, $y'(t) = re^{rt}$ y''(t) = re, and we get



 $e^{rt}(r^{2}+r-6)=0$ e^{rt} e^{rt} $c_{9}+c_{-}c_{=}O$ $(\Gamma+3)(\Gamma-3)=0$ r = -3, 3 $f_1(t) = e \quad \text{and} \quad f_2(t) = e^{3t}$ are solutions

We get that $C_1 e^{-3t} + C_2 e^{2t} = y(t)$ is a solution for all constants CI, Ca. Use initial conditions to determine CI, (2: Y(0) = 1, 50 $C_1 + C_2 = 1$



 $= -3C_1 + 2C_2$

We get the equations $C_{1} + C_{2} = 1$ -3(1+2)(2=0)

Substituting C1=1-C2 into the second equation,

$$-3 + 3(a + 2C_{d} = 0),$$

so
$$C_{a} = \frac{3}{5} \text{ and }$$
$$C_{1} = 1 - (a = \frac{3}{5})$$

Final answor:

 $Y(t) = \frac{2}{5}e^{-3t} + \frac{3}{5}e^{2t}$

(): How do we know what solutions look like?

Nice Result: Given a second-order, linear differential equation that is homogeneous with constant coefficients, all solutions are either of the form