

$$\begin{aligned}
y'' - 5y' + 6 &= 0 \\
t^2 - 5t + 6 &= 0 \\
a = 1 \quad b = -5 \quad c = 6 \\
D = -5^2 - 4 * 1 * 6 &= 25 - 24 = 1 \\
t_{1,2} = \frac{-(-5) \pm \sqrt{1}}{2} &= \frac{5 \pm 1}{2} = 3, 2 \\
Y = Ae^{2x} + Be^{3x}
\end{aligned}$$

$$\begin{aligned}
y'' + 6y' + 5y &= 0 \\
t^2 + 6t + 5 &= 0 \\
a = 1 \quad b = 6 \quad c = 5 \\
D = 5^2 - 4 * 1 * 5 &= 36 - 20 = 16 \\
t_{1,2} = \frac{-6 \pm \sqrt{16}}{2 * 1} &= \frac{-6 \pm 4}{2} = -5, -1 \\
Y = Ae^{-5x} + Be^{-x}
\end{aligned}$$

$$\begin{aligned}
y'' - y' - 2y &= 0 \\
t^2 - t - 2 &= 0 \\
a = 1 \quad b = -1 \quad c = -2 \\
D = -1^2 - 4 * 1 * -2 &= 1 - 8 = 1 + 8 = 9 \\
t_{1,2} = \frac{-(-1) \pm \sqrt{9}}{2 * 1} &= \frac{1 \pm 3}{2} = 2, -1 \\
Y = Ae^{-x} + Be^{2x}
\end{aligned}$$

$$\begin{aligned}
y'' + 2y' + y &= 0 \\
t^2 + 2t + 1 &= 0 \\
a = 1 \quad b = 2 \quad c = 1 \\
D = 2^2 - 4 * 1 * 1 &= 4 - 4 = 0 \\
t_{1,2} = \frac{-2 \pm \sqrt{0}}{2 * 1} &= -1 \\
Y = (Ax + B)e^{-x}
\end{aligned}$$

$$\begin{aligned}
y'' - 4y' + 4y &= 0 \\
t^2 - 4t + 4 &= 0 \\
a = 1 \quad b = -4 \quad c = 4 \\
D = -4^2 - 4 * 1 * 4 &= 16 - 16 = 0 \\
t_{1,2} = \frac{-(-4) \pm \sqrt{0}}{2 * 1} &= \frac{4}{2} = 2 \\
Y = (Ax + B)e^{2x}
\end{aligned}$$

$$\begin{aligned}
4y'' + 4y' + y &= 0 \\
4t^2 + 4t + 1 &= 0 \\
a = 4 \quad b = 4 \quad c = 1 \\
D = 4^2 - 4 * 4 * 1 &= 16 - 16 = 0
\end{aligned}$$

$$t_{1,2} = \frac{-4 \pm \sqrt{0}}{2 * 4} = \frac{-4}{8} = -\frac{1}{2}$$

$$Y = (Ax + B)e^{-\frac{x}{2}}$$