

Quiz # 7– Math 2233, Differential Equations – Oct. 23, 2008

1. Find the general solution to

$$y^{(4)} + 3y'' - 4y = 0$$

Solution. The characteristic equation is

$$\begin{aligned} r^4 + 3r^2 - 4 &= 0 \\ \Rightarrow (r^2 + 4)(r^2 - 1) &= 0 \\ \Rightarrow (r - 2i)(r + 2i)(r - 1)(r + 1) &= 0 \\ \Rightarrow r_1 = 2i, \quad r_2 = -2i, \quad r_3 = 1, \quad r_4 = -1 \end{aligned}$$

Hence the general solution is

$$y = c_1 \cos 2t + c_2 \sin 2t + c_3 e^t + c_4 e^{-t}$$