

WRITE YOUR NAME:

MAP 2302 Quiz 11
Thursday October 10th

Find the general solution of the nonhomogeneous differential equation.

$$y'' - 3y' + 2y = 18e^{4t}$$

STEP 1. Find GENERAL solution of associated HOMOGENEOUS equation.

Auxiliary equation is $r^2 - 3r + 2 = 0 \Rightarrow (r-1)(r-2) = 0$
 $\Rightarrow r=1, r=2 \Rightarrow$ Gen soln of homog eqn is $y = c_1 e^t + c_2 e^{2t}$.

STEP 2. Find PARTICULAR solution of NONHOMOGENEOUS equation.

In this case, try $y = Ae^{4t} \Rightarrow y' = 4Ae^{4t} \Rightarrow y'' = 16Ae^{4t}$

Plug into DE. $\underbrace{16Ae^{4t}}_{y''} - 3 \cdot \underbrace{4Ae^{4t}}_{y'} + 2 \cdot \underbrace{Ae^{4t}}_y = 18e^{4t}$

$$(16A - 12A + 2A)e^{4t} = 18e^{4t}$$

$$6Ae^{4t} = 18e^{4t}$$

$$6A = 18 \Rightarrow A = 3 \Rightarrow y = 3e^{4t}$$

is a particular soln

FINAL ANSWER:

$$y = c_1 e^t + c_2 e^{2t} + 3e^{4t}$$