APPLICATION QUESTIONS 3

Find the homogeneous solutions of the linear ODE with constant coefficient whose roots of the characteristic equations are given below.

a. $r_1 = 1\ ,\ r_2 = -1\ ,\ r_3 = \frac{2}{3}\ ,\ r_4 = -\frac{2}{3}\ ,\ r_5 = 5\ ,r_6 = -6$

b. $r_1 = r_2 = 0\ ,\ r_3 = r_4 = -2\ ,\ r_5 = 3i\ ,r_6 = -3i$

c. $r_1 = r_2 = 2i\ ,\ r_3 = r_4 = -2i\ ,\ r_5 = i\ ,r_6 = -i$

d. $r_1 = r_2 = r_3 = 2\ ,\ r_4 = -2\ ,\ r_5 = 2 - 3i\ ,r_6 = 2 + 3i$

e. $r_1 = r_2 = r_3 = i\ ,\ r_4 = r_5 = r_6 = -i$

f. $r_1 = r_2 = -1 + 3i\ ,\ r_3 = r_4 = -1 - 3i\ ,\ r_5 = 2\ ,r_6 = -2$

g. $r_1 = r_2 = r_3 = 2 - i\ ,\ r_4 = r_5 = r_6 = 2 + i$

h. $r_1 = \sqrt{2}\ ,\ r_2 = r_3 = 2i\ ,\ r_4 = r_5 = -2i\ ,r_6 = \sqrt{3}$

i. $r_1 = i\ ,\ r_2 = -i\ ,\ r_3 = -2i\ ,\ r_4 = 2i\ ,\ r_5 = 3i\ ,r_6 = -3i$

j. $r_1 = 1\ ,\ r_2 = -1\ ,\ r_3 = i\ ,\ r_4 = -i\ ,\ r_5 = 1 + i\ ,r_6 = 1 - i$

k. $r_1 = 2\ ,\ r_2 = r_3 = -1\ ,\ r_4 = r_5 = r_6 = -3$

l. $r_1 = r_2 = r_3 = \frac{3}{2}i\ ,\ r_4 = r_5 = r_6 = -\frac{3}{2}i$

m. $r_1 = r_2 = r_3 = -3 + 5i\ ,\ r_4 = r_5 = r_6 = -3 - 5i$

n. $r_{1,2} = 1 \pm \sqrt{2}i\ ,\ r_{3,4} = \pm\sqrt{2}i\ ,\ r_{5,6} = -\sqrt{2}$

1. Find the homogeneous solutions of the following linear ODE with constant coefficient

a. $y''' - 3y'' - y' + 3y = 2e^{3x} + 7x$

b. $y''' + 2y'' - 4y' - 8y = 4x + 7$

c. $y''' - 3y'' + 3y' - y = 8xe^{x} + sinx$

d. $y^{v} + 9y''' = 11xsin3x$

e. $y^{iv} - 4y''' + 29y'' = 0$

f. $y''' - y'' - y' + y = 9e^{-x} + 4$

g. $y''' - 5y'' + 6y' = 9x - 3$