

1. Solve the following DE:

a) $y''' - y'' + y' - y = 9e^{-x}$

b) $y'' + 3y' - 10y = 29 \sin(2x)$

c) $6y'' - y' - y = 50e^{\frac{x}{2}} + 4x^2 - 5$

d) $y'' + 9y = 18\cos(3x) + 26e^{-2x}; y(0) = -1, y'(0) = 2$

e) $y'' + 6y' + 18y = 18e^{-3x} + 45\sin(3x)$

f) $9y'' + 6y' + 8y = 176e^{4x} + 37\sin(x)$

2. Solve by annihilator technique:

a) $(D+1)(D-3)y = 4(e^{-x} - 2\cos x)$

b) $D(D+3)y = x(5 + e^x)$

c) $(D^2 + D - 2)y = 4\cos x - 2\sin x, y(0) = -1, y'(0) = 4$

d) $(D - 1)(D - 2)(D - 3)y = 6e^{4x}; y(0) = 4, y'(0) = 10, y''(0) = 30$