Tensor Algebra

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$y''' + 4y'' + 3y' = x^2 \cos x - 3x$ First, we solve for y_c. The auxiliary equation is

$$\begin{aligned} m^3 + 4m^2 + 3m &= m(m^2 + 4m + 3) &&= m(m+3)(m+1) \\ m &= 0, -3, -1 \end{aligned}$$

Hence $y_c = c_1 + c_2 e^{-3} x + c_3 e^{-1}$.

For the left side, the annihilator will be

$$(D^3 + 4D^2 + 3D)y$$

$$= D(D^2 + 4D + 3)y$$

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