Mathematical Methods II
Workshop 2

(1) Solve the following differential equation

$$y'' + 4y = x^2 \sin(2x), \tag{1}$$

using the trial function technique. [pag. 496 of the book]

(2) Consider the following differential equation

$$y'' - 3y' + 2y = 2e^{-x}. \tag{2}$$

(a) Solve Eq. (2) with boundary condition $y(0) = y'(0) = 0$, using the trial function method.

(b) Solve Eq. (2) with boundary condition $y(0) = y'(0) = 0$, using the Laplace transform technique. Remember that

$$\mathcal{L}\left[e^{\alpha x}\right](s) = \frac{1}{s - \alpha}. \tag{3}$$

[pag. 502 of the book]