

$$y''' - 2y'' + y' = e^t; \quad y(0) = 1, y'(0) = 0, y''(0) = 1.$$

$$y(t) = c_1 + c_2 e^t + c_3 \cdot t \cdot e^t + \frac{1}{2} t^2 \cdot e^t$$

$$y'(t) = c_2 \cdot e^t + c_3 \cdot (t+1) \cdot e^t + \left(\frac{1}{2} t^2 + t\right) \cdot e^t$$

$$y''(t) = c_2 e^t + c_3 \cdot (t+2) \cdot e^t + \left(\frac{1}{2} t^2 + 2t + 1\right) \cdot e^t$$

$$y(0) = 1: \quad c_1 + c_2 = 1$$

$$y'(0) = 0: \quad c_2 + c_3 = 0$$

$$y''(0) = 1: \quad c_2 + 2c_3 + 1 = 1$$

$$c_2 = -c_3, \quad c_3 = 0, \quad c_2 = 0, \quad c_1 = 1$$

$$y(t) = 1 + \frac{1}{2} t^2 \cdot e^t.$$