Solve differential equations using the Laplace method

Ex. 1.

$$\dot{y}(t) + y(t) = \mathbf{1}(t) + e^{-t}, \;\; y(0) = 0$$

Ex. 2.

$$\dot{v}(t) + 3v(t) = 5e^{2t}, \;\; v(0) = 4$$

Ex. 3.

$$\ddot{y}(t) + 3\dot{y}(t) + 2y(t) = 5, \;\; y(0) = -1, \dot{y}(0) = 2$$

Ex. 4.

$$\ddot{y}(t) + 4y(t) = \sin(t - 2\pi), \;\; y(0) = 0, \;\; \dot{y}(0) = 0$$

Ex. 5.

$$\ddot{y}(t) + 2\dot{y}(t) + y(t) = \mathbf{1}(t), \;\; y(0) = 0, \;\; \dot{y}(0) = 0$$