

Convolution's + Laplace Transform.

Example

① Consider the ODE

$$y'' - 2y' - 3y = g(t) \quad y(0) = y_0, y'(0) = y_0'$$

Let $g(t) = t$ be the input, and let $y_0 = 0$ $y_0' = 0$

Solve using Laplace Transform method and, in the inversion step, use a convolution integral.

② Solve the same problem using the method of undetermined coefficients

③ Now consider this same ODE but suppose
 $g(t) = e^{-t}$ $y(0) = 0$ $y'(0) = 1$

apply the same methods as in part ① to this new variant. (Note that many steps will be similar, but you'll have a different convolution to compute.)

Scan 1