

Second Order Equations

Solving second order linear non-homogeneous differential equations

Solutions

(1) $y(t) = c_1 e^{-2t} + c_2 e^{-3t} + \frac{3}{52} \sin(2t) - \frac{15}{52} \cos(2t).$

(2) (2.1) $y(t) = e^{-2t} - e^{-3t} - t e^{-3t}.$

(2.2) If $\frac{1}{(s+2)(s+3)^2} = \frac{a}{(s+2)} + \frac{b}{(s+3)} + \frac{c}{(s+3)^2}$, the the solution of the IVP is

$$y(t) = a e^{-2t} + b e^{-3t} + c t e^{-3t}.$$

If time is available, one can find $a = 1$, $b = -1$, and $c = -1$, to arrive at $y(t) = e^{-2t} - e^{-3t} - t e^{-3t}.$