

1. 解 $y' - 2y = e^{-3t}$, $y(0) = 1$.

<解> $[sY(s) - y(0)] - 2Y(s) = \frac{1}{s+3}$

$$[sY(s) - 1] - 2Y(s) = \frac{1}{s+3}$$

$$(s-2)Y(s) = 1 + \frac{1}{s+3}$$

$$(s-2)Y(s) = \frac{s+4}{s+3}$$

$$Y(s) = \frac{s+4}{(s-2)(s+3)}$$

$$= \frac{A}{s-2} + \frac{B}{s+3}$$

$$= \frac{A(s+3) + B(s-2)}{(s-2)(s+3)}$$

$$s+4 = A(s+3) + B(s-2)$$

$$\text{令 } s=2 \quad A(2+3) = 2+4 \quad A = \frac{6}{5}$$

$$\text{令 } s=-3 \quad B(-3-2) = -3+4 \quad B = -\frac{1}{5}$$

$$Y(s) = \frac{6}{5} \frac{1}{s-2} - \frac{1}{5} \frac{1}{s+3}$$

$$y(t) = \frac{6}{5} e^{2t} - \frac{1}{5} e^{-3t}$$