(c) Str. 26

$$\frac{d^2y(t)}{dt} + 2\frac{dy(t)}{dt} + 2y(t) = u(t),$$

ako je $u(t) = (3t+2)\sigma(t)$, uz uslove $y(0)=1$, $y'(0)=2$

$$y'' + 2y' + 2y = u(t)$$

$$y'' + 2y' + 2y = 3t+2 \rightarrow y'' = 3t+2-2y'-2y$$

$$s^2Y(s) - sy(0) - y'(0) + 2sY(s) - 2y(0) + 2Y(s) = \frac{3}{s^2} + \frac{2}{s}$$

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

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

$$Y(s)\left(s^2+2s+2\right) = \frac{3+2s+s^3+4s^2}{s^2}$$

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

$$\frac{s^3+4s^2+2s+3}{s^2(s^2+2s+2)} = \frac{A}{s} + \frac{B}{s^2} + \frac{Cs+D}{s^2+2s+2} \quad / \cdot s^2(s^2+2s+2)$$

$$s^3+4s^2+2s+3 = As(s^2+2s+2) + B(s^2+2s+2) + s^2(Cs+D)$$

$$s^3+4s^2+2s+3 = As^3+2As^2+2As + Bs^2+2Bs+2B + Cs^3+Ds^2$$

$$s^3+4s^2+2s+3 = s^3(A+C) + s^2(2A+B+D) + s(2A+2B) + 2B$$

$A+C=1$ $\quad$ $2A+B+D=4$ $\quad$ $2A+2B=2$ $\quad$ $2B=3$

$C=\frac{3}{2}$ $\quad$ $-1+\frac{3}{2}+D=4 \;/\cdot 2$ $\quad$ $2A=2-3$ $\quad$ $B=\frac{3}{2}$

$2D = 8+2-3$ $\quad$ $A=-\frac{1}{2}$

$D=\frac{7}{2}$

$$\frac{s^3+4s^2+2s+3}{s^2(s^2+2s+2)} = -\frac{1}{2}\frac{1}{s} + \frac{3}{2}\frac{1}{s^2} + \frac{\frac{3}{2}s+\frac{7}{2}}{s^2+2s+2}.$$

$$= -\frac{1}{2}\frac{1}{s} + \frac{3}{2}\frac{1}{s^2} + \frac{\frac{3}{2}s+\frac{7}{2}}{(s+1)^2+1}$$

$$\boxed{y(t) = -\frac{1}{2} + \frac{3}{2}t + \frac{3}{2}e^{-t}\cos t + 2e^{-t}\sin t}$$

$$\frac{\frac{3}{2}s+\frac{7}{2}}{(s+1)^2+1} = \quad = \frac{\frac{3}{2}((s+1)-1)+\frac{7}{2}}{(s+1)^2+1} = \frac{\frac{3}{2}(s+1)-\frac{3}{2}+\frac{7}{2}}{(s+1)^2+1}$$

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

$$= \frac{3}{2}e^{-t}\cos t + 2e^{-t}\sin t$$
