Exempel – se powerpointbild "Överlagrade pol-nollställediagram"

- $H(s) = \dfrac{3s}{(s+1)^2+2^2}$; $Re\{s\} > -1$ $\qquad h(t) = ?$

$$H(s) = \frac{3(s+1) - \overset{3 = \frac{3}{2}\cdot 2}{3}}{(s+1)^2+2^2} = 3\,\frac{s+1}{(s+1)^2+2^2} - \frac{3}{2}\cdot\frac{2}{(s+1)^2+2^2}$$

$Re\{s\} > -1$

Tab. 19:25 resp. 19:23 $\Rightarrow$

$$h(t) = 3e^{-t}\cos(2t)u(t) - \frac{3}{2}e^{-t}\sin(2t)u(t)$$

$$\left(= Ae^{-t}\cos(2t+\varphi)\,u(t)\right)$$

- $x(t) = (1+e^{-2t})u(t) \Longleftrightarrow X(s) = \dfrac{2(s+1)}{s(s+2)}$; $Re\{s\} > 0$. $y_{zs}(t) = ?$

$$Y_{zs}(s) = X(s)H(s) = \frac{2(s+1)}{\cancel{s}(s+2)}\cdot\frac{3\cancel{s}}{(s+1)^2+2^2} = \frac{6s+6}{(s+2)\left((s+1)^2+2^2\right)}$$

$$= \frac{B}{s+2} + \frac{Cs+D}{(s+1)^2+2^2} \Rightarrow B = \frac{-6}{5},\ C = \frac{6}{5},\ D = 6$$

$$\text{Dvs. } Cs+D = \frac{6}{5}s + 6 = \frac{6}{5}(s+1)\underbrace{-\frac{6}{5}+6}_{=\frac{24}{5}\cdot\frac{2}{2}}$$

$$\Rightarrow Y_{zs}(s) = \frac{-6}{5}\,\frac{1}{s+2} + \frac{6}{5}\,\frac{s+1}{(s+1)^2+2^2} + \frac{24}{5\cdot 2}\,\frac{2}{(s+1)^2+2^2}$$

$Re\{s\} > -2$ $\qquad Re\{s\} > -1$

Tab. 19:12, 19:25 resp. 19:23 $\Rightarrow$

$$y_{zs}(t) = -\frac{6}{5}e^{-2t}u(t) + \frac{6}{5}e^{-t}\cos(2t)u(t) + \frac{12}{5}e^{-t}\sin(2t)u(t)$$

$$= \frac{6}{5}\Big(e^{-2t} + \underbrace{e^{-t}\big(\cos(2t) + 2\sin(2t)\big)}_{= Ee^{-t}\cos(2t+\beta)}\Big)u(t)$$

$\leftarrow$ h-term

x-term
(insignalens $u(t)$-term är bortfiltrerad)

Allmänt: $y(t) = \{x\text{-termer}\} \cup \{h\text{-termer}\}$, skalade