

Ex.S4 Response of electric circuit when impulse response and input signal are shown as follows. Sinusoidal waves input. $R=1\Omega, L=1\text{ H}$ (Series connection)

$R:=1$ $L:=1$ $Z(s):=R+s\cdot L$ $h(t):=e^{-t}$ impulse response

$h(t):=e^{-t}$ $H(s):=\frac{1}{s+1}$ $R:=1$ $\omega:=1$ $L:=1$

$x(t):=\sin(t) + \sin(2\cdot t) + \sin(3\cdot t)$ *input_signal*

$$y(t) := \int_0^t x(\tau) \cdot h(t-\tau) d\tau \rightarrow \frac{6 \cdot e^{-t}}{5} - \frac{3 \cdot \cos(3 \cdot t)}{10} - \frac{2 \cdot \cos(2 \cdot t)}{5} + \frac{\sin(2 \cdot t)}{5} + \frac{\sin(3 \cdot t)}{10} - \frac{\cos(t)}{2} + \frac{\sin(t)}{2}$$

$$y(t) := \int_0^t x(t-\tau) \cdot h(\tau) d\tau \rightarrow \frac{6 \cdot e^{-t}}{5} - \frac{3 \cdot \cos(3 \cdot t)}{10} - \frac{2 \cdot \cos(2 \cdot t)}{5} + \frac{\sin(2 \cdot t)}{5} + \frac{\sin(3 \cdot t)}{10} - \frac{\cos(t)}{2} + \frac{\sin(t)}{2}$$

output_signal

