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Ex.S6 Response of electric circuit when impulse response and input signal are shown as follows. Sinusoidal waves input. R=1Ω,L=1 H (Series connection)

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

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

$H(\omega) := \frac{1}{1+\omega \cdot 1\mathrm{i}} \qquad H_0(\omega) := \sqrt{\mathrm{Re}(H(\omega))^2 + \mathrm{Im}(H(\omega))^2} \qquad \phi(\omega) := \arg(H(\omega))$

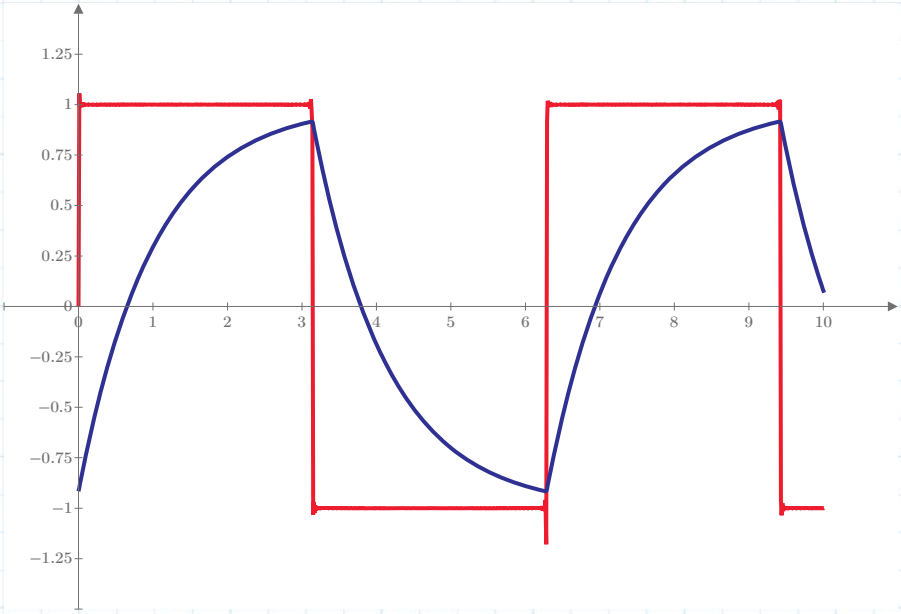
$m := 500$

$n := 1,2..m \qquad H_n := \frac{1}{1+(2\,n-1)\cdot 1\mathrm{i}} \qquad H_{0_n} := \sqrt{\mathrm{Re}(H_n)^2 + \mathrm{Im}(H_n)^2} \qquad \phi_n := \arg(H_n)$

$t := 0, 0.01..10.1$

$$x(t) := \sum_{n=1}^{m} \left( \frac{4}{\pi} \frac{1}{(2 \cdot n - 1)} \cdot \sin((2\,n-1) \cdot t) \right)$$ *input_signal*

$$y(t) := \sum_{n=1}^{m} \left( H_{0_n} \cdot \frac{4}{\pi} \cdot \frac{1}{(2 \cdot n - 1)} \cdot \sin((2\,n-1) \cdot t + \phi_n) \right)$$ *output_signal*




*input_signal*

$x(t)$

$y(t)$

*output_signal*

$t$

$y(0) = -0.917 \qquad y(\pi) = 0.917$

$$(1+A) \cdot e^{-\pi} - 1 = -A \xrightarrow{solve, A} \frac{2}{e^{-\pi}+1} - 1 = 0.917$$

$1.917 \cdot e^{-\pi} - 1 = -0.917$