$$\frac{1}{(x+5)(x-1)} = \frac{A}{x+5} + \frac{B}{x-1} \quad \Big| \cdot \text{Nenner}$$

$$1 = \frac{A\cdot\cancel{(x+5)}(x-1)}{\cancel{x+5}} + \frac{B\cdot(x+5)\cancel{(x-1)}}{\cancel{x-1}}$$

$$1 = A(x-1) + B\cdot(x+5)$$

$x=1$:

$$1 = B(1+5) \Leftrightarrow B = \frac{1}{6}$$

$x=-5$:

$$1 = A(-5-1) \Leftrightarrow A = -\frac{1}{6}$$

$$\frac{1}{(x+5)(x-1)} = \frac{-\frac{1}{6}}{x+5} + \frac{\frac{1}{6}}{x-1}$$

$$\frac{1}{(x+5)(x-1)^3} = \frac{A}{x+5} + \frac{B}{x-1} + \frac{C}{(x-1)^2} + \frac{D}{(x-1)^3}$$

$$\frac{1}{(x+5)\cancel{(x-1)}} = \frac{-\frac{1}{6}}{x+5} + \frac{\frac{1}{6}}{x-1}$$

$$\frac{x}{x^2+2x-8} = \frac{x}{(x-2)(x+4)} = \frac{\frac{1}{3}}{x-2} + \frac{\frac{2}{3}}{x+4}$$

$$x_{1,2} = -1 \pm \sqrt{1+8} = -1 \pm 3$$

$$h(t) \circ\!\!-\!\!\bullet\ H(s)$$

$$h(t<0) = 0$$

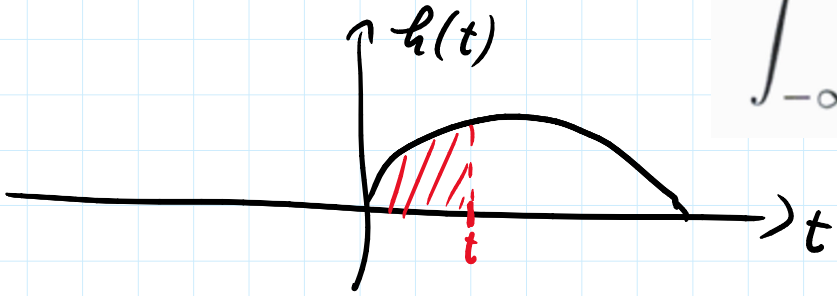
$$h(t-2) \circ\!\!-\!\!\bullet\ H(s)\cdot e^{-2s}$$

Integration

$$\int^t x(\tau)d\tau$$

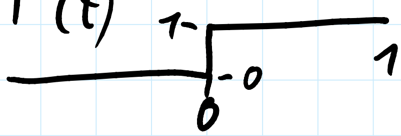
$h(t)$

$$\int_{-\infty}^{t} x(\tau)d\tau$$



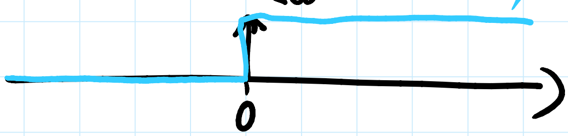
$$h(t) * g(t) \circ\!\!-\!\!\bullet\; H(s)\cdot G(s)$$

$\Gamma(t)$



$1 \quad \bullet\!\!-\!\!\circ \quad \frac{1}{s}$

$$\int_{-\infty}^{t} \delta(t) = \Gamma(t)$$



$$\Gamma(t) * \Gamma(t) = \Gamma(t)\cdot t$$

$$\frac{1}{s}\cdot\frac{1}{s} = \frac{1}{s^2}$$

$$\sin(\omega_0 t) \quad \circ\!\!-\!\!\bullet \quad \frac{\omega_0}{s^2+\omega_0^2}$$

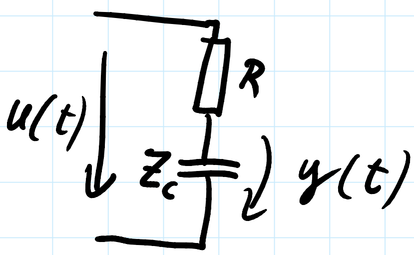
$$\downarrow d/dt \qquad\qquad \downarrow \cdot s$$

$$\frac{\omega_0 \cos(\omega_0 t)}{\omega_0} \qquad s\frac{1}{\cancel{\omega_0}}\,\frac{\cancel{\omega_0}}{s^2+\omega_0^2}$$

$$i = C\cdot\frac{d}{dt}u$$

$$I = C\cdot sU$$

$$\Leftrightarrow \frac{U}{I} = \frac{1}{sC}$$



$$Z_c = \frac{U}{I} = \frac{1}{sC}$$

$$Z_L = sL$$

$$u * h = y \qquad\qquad \delta(t) * h(t) = y(t)$$

$$\circ\!-\!\bullet \qquad\qquad \circ\!-\!\bullet$$

$$U \cdot H = Y \qquad\qquad 1 \cdot H = Y$$

$$\Leftrightarrow \quad H = \frac{Y}{U}$$

$$\bullet\!-\!\circ$$

$$h(t)$$

$H(s)$ = Übertragungsfunktion

$\bullet\!-\!\circ$

$h(t)$ = Impulsantwort

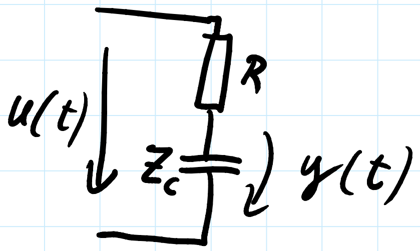
$$u(t) = \varepsilon(t) = \Gamma(t)$$

$$\circ\!-\!\bullet$$

$$\frac{1}{s} \Rightarrow G(s) = \frac{1}{s} \cdot H(s)$$

$$\bullet\!-\!\circ$$

$$g(t) = \int_{-\infty}^{t} h(\tau)\, d\tau = \int h$$



$$Z_C = \frac{U}{J} = \frac{1}{sC}$$

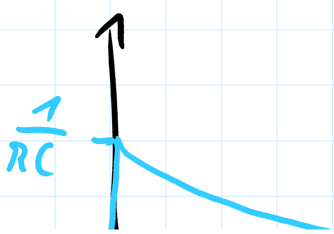
$$Z_L = sL$$

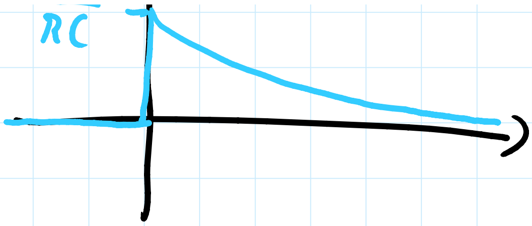
$$H(s) = \frac{Y}{U} = \frac{\frac{1}{sC}}{R + \frac{1}{sC}} = \frac{1}{sRC+1} = \frac{1}{s + \frac{1}{RC}} \cdot \frac{1}{RC}$$

$e^{-at}\varepsilon(t)$	$\frac{1}{s+a}$

$$\bullet\!-\!\circ$$

$$h(t) = \frac{1}{RC} e^{-\frac{1}{RC}t}$$





$$g(t) = \int_0^t h(\tau)\, d\tau = \left[-\frac{1}{\cancel{RC}} \cdot \cancel{RC} \cdot e^{-\frac{1}{RC}\tau} \right]_0^t$$

$$= \underline{-e^{-\frac{1}{RC}t} \cdot \Gamma(t)} + \underline{1}$$