Bsp:

$t_0 = 1$

$h(t) = 2\,\mu(t) - 2\,\mu(t-1) \quad \circ\!\!-\!\!\bullet \quad 2\,H(s) - 2\,e^{-s\cdot 1}\,H(s) = 2(1-e^{-s})\,H(s)$

$= 2\,\frac{1-e^{-s}}{s}$ $\qquad$ RoC = $\mathbb{C}$

Nachtrag:

$f(t) \circ\!\!-\!\!\bullet F(s)$

$t_0 \in \mathbb{R}$

Verschiebungssatz

$f(t-t_0) \circ\!\!-\!\!\bullet \int_{-\infty}^{+\infty} f(t-t_0)\,e^{-st}\,dt =$

Substitution: $t - t_0 = \tau$, $t = \tau + t_0$, $dt = d\tau$

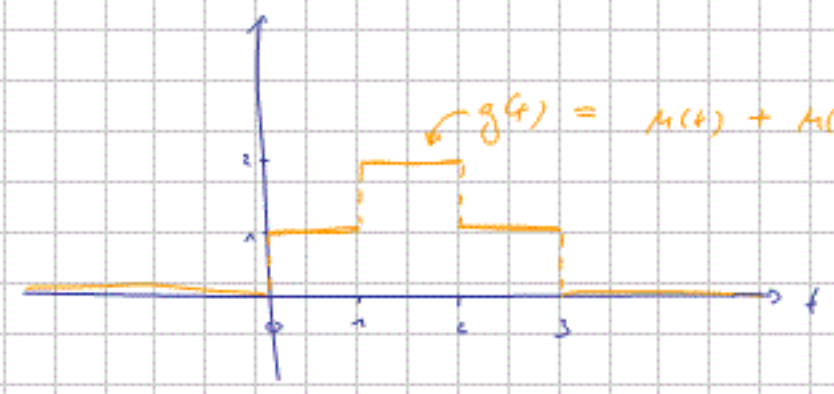
$= e^{-st_0} \int_{-\infty}^{+\infty} f(\tau)\,e^{-s\tau}\,d\tau = e^{-st_0}\cdot F(s)$

$$h(t) = \begin{cases} 2: & 0 \le t < 1 \\ 0: & t < 0 \quad \text{oder} \quad t > 1 \end{cases}$$

$H(s) = \int_0^1 2\cdot e^{-st}\,dt = 2\,\frac{e^{-st}}{-s}\Big|_0^1 = \frac{2}{-s}\left(e^{-s} - 1\right) = 2\,\frac{1-e^{-s}}{s}$

RoC = $\mathbb{C}$

$\hat{h}(\omega) = H(j\omega) = 2\,\frac{1-e^{-j\omega}}{j\omega}$



$g(t) = \mu(t) + \mu(t-1) - \mu(t-2) - \mu(t-3)$

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

$= \frac{1}{s}\left(1 + e^{-s} - e^{-2s} - e^{-3s}\right)$

$\hat{g}(\omega) = G(j\omega) = \frac{1}{j\omega}\left(1 + e^{-j\omega} - e^{-j2\omega} - e^{-j3\omega}\right)$

Bsp:

$h(t) = \frac{1}{2}\cdot t\,\mu(t) - 2\cdot\frac{1}{2}(t-2)\,\mu(t-2) + \frac{1}{2}(t-4)\,\mu(t-4)$

$H(s) = \frac{1}{2}\cdot\frac{1}{s^2} - 2\cdot\frac{1}{2}\cdot e^{-s\cdot 2}\cdot\frac{1}{s^2} + \frac{1}{2}\cdot e^{-s\cdot 4}\cdot\frac{1}{s^2}$