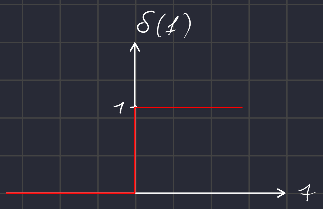
Faltung



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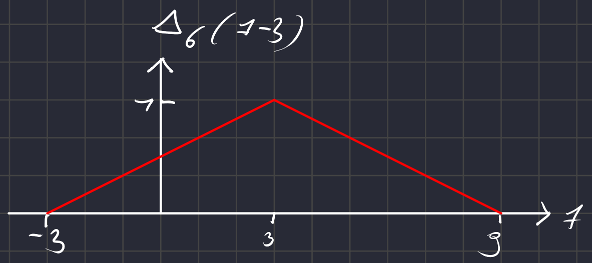
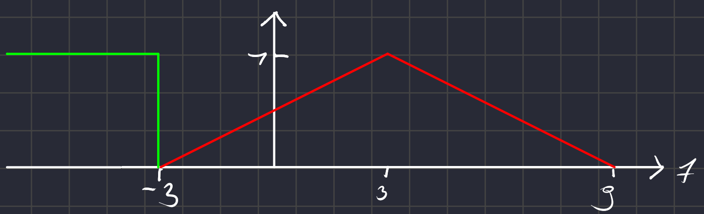


1. Fall



$$y(t) = \int_{t}^{-3} \sigma(t-\tau)\, h(\tau)\, d\tau$$

$$y(t) = 0$$

2. Fall

$$y(t) = \int_{-3}^{t} \delta(t-\tau)\, h(\tau)\, d\tau$$

$$= \int_{-3}^{t} 1\left(\frac{1}{6}\tau + 0{,}5\right) d\tau = \int_{-3}^{t} \frac{1}{6}\tau + 0{,}5 \; d\tau$$

$$= \left[\frac{1}{6} \cdot \frac{1}{2}\tau^2 + 0{,}5\tau\right]_{-3}^{t}$$

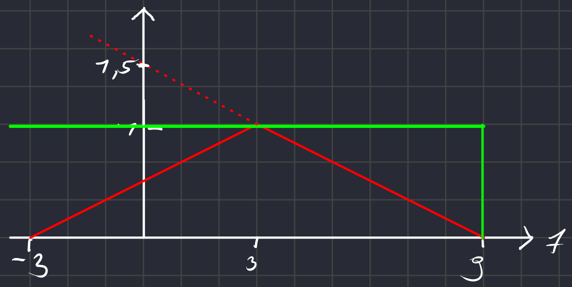
$f(x)$	$F(x)$
1	x
x	$\frac{1}{2}x^2$

$$= \left(\frac{1}{12}t^2 + 0{,}5t\right) - \left(\frac{1}{2}(-3)^2 + 0{,}5(-3)\right)$$

$$= \frac{1}{12}t^2 + 0{,}5t - \left(\frac{9}{12} + (-1{,}5)\right) = \frac{1}{12}t^2 + \frac{1}{2}t - \frac{3}{4} - 1\frac{2}{4}$$

$$= \frac{1}{12}t^2 + \frac{t}{2} - 2\frac{1}{4}$$

3. Fall



$$y(t) = \int_3^t 1\left(-\frac{1}{6}\tau + 1{,}5\right) d\tau = \int_5^t -\frac{1}{6}\tau + 1{,}5 \, d\tau$$

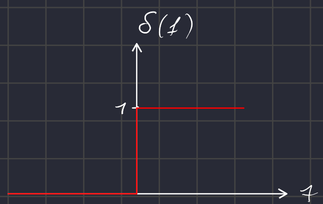
$$= \left[-\frac{1}{6}\cdot\frac{1}{2}\tau^2 + 1\tfrac{1}{2}\tau\right]_3^t$$

$$= \left(-\frac{1}{12}t^2 + 1\tfrac{1}{2}t\right) - \left(-\frac{1}{12}(3)^2 + \frac{3}{2}\cdot 3\right)$$

$$= -\frac{1}{12}t^2 + 1\tfrac{1}{2}t - \left(-\frac{9}{12} + \frac{9}{2}\right)$$

$$-\frac{1}{12}t^2 + 1\tfrac{1}{2}t - \left(-\frac{3}{4} + \frac{18}{4}\right)$$

$$\underline{\underline{-\frac{1}{12}t^2 + \frac{3}{2}t - 3\tfrac{3}{4}}}$$



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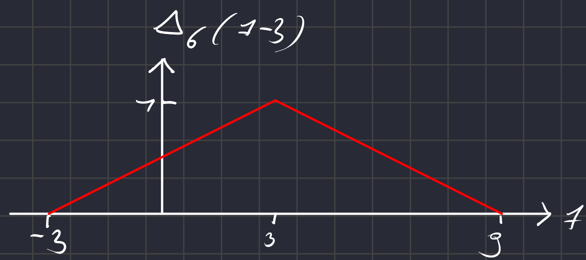

1) $\sigma(t) * \Delta_3(t-2)$

2) $0{,}5\,\sigma(t) * \Delta_2(t-3)$

3) $\sigma(t) * 2\cdot\Delta_4(t)$

4) $2\,\sigma(t) * 0{,}5\cdot\Delta(t-5)$