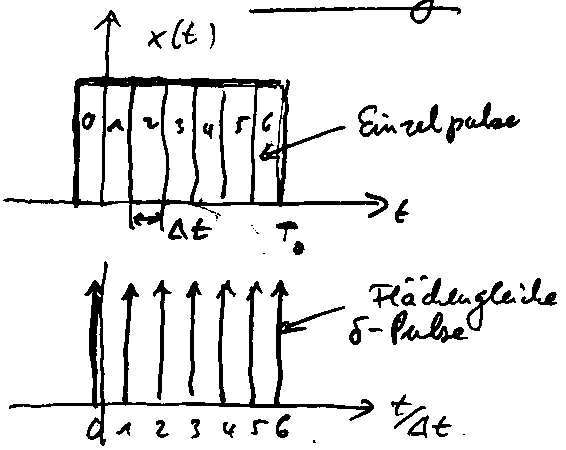
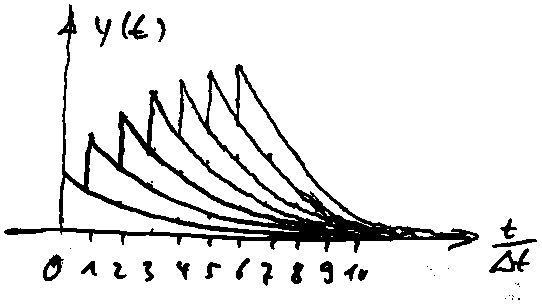
Faltung



$$x(t) = \sum_{n=0}^{6} x(t_n)\,\delta(t - n\Delta t)$$



$$y(3) = x(0)\Delta t\, h(3) + x(1)\Delta t\, h(2) + x(2)\Delta t\, h(1) + x(3)\Delta t\, h(0)$$

$$= \sum_{i=0}^{3} h(i)\,x(3-i)\Delta t = \sum_{i=0}^{3} h(3-i)\,x(i)\,\Delta t$$

$$\rightarrow\ y(t_1) = \int_{-\infty}^{t_1} x(t)\,h(t_1 - t)\,dt = \int_{-\infty}^{t_1} x(t_1 - t)\,h(t)\,dt$$

$$\boxed{y(t) = \int_{-\infty}^{\infty} x(\tau)\,h(t-\tau)\,d\tau = x(t) * h(t)}$$

Bei kreales System:

$$\boxed{\begin{aligned} y(n) &= \sum_{i=-\infty}^{\infty} h(i)\,x(n-i) = \sum_{i=-\infty}^{\infty} h(n-i)\,x(i) \\ y(n) &= x(n) * h(n) \end{aligned}}$$