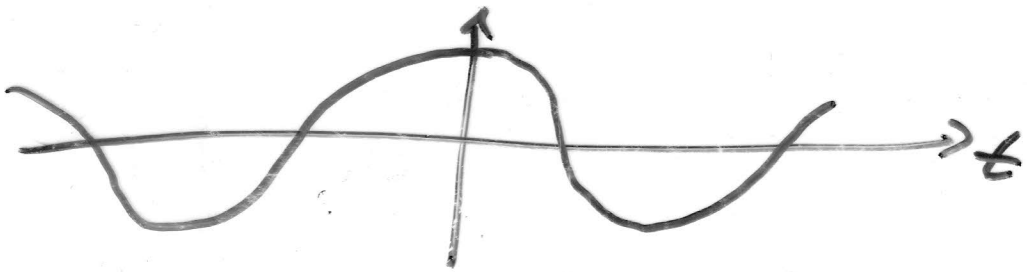
~~4.2.~~ Deterministische Signale

~~4.2.1.~~ (5.1.) ~~2.2.1.~~ Gerade und ungerade Signalanteile

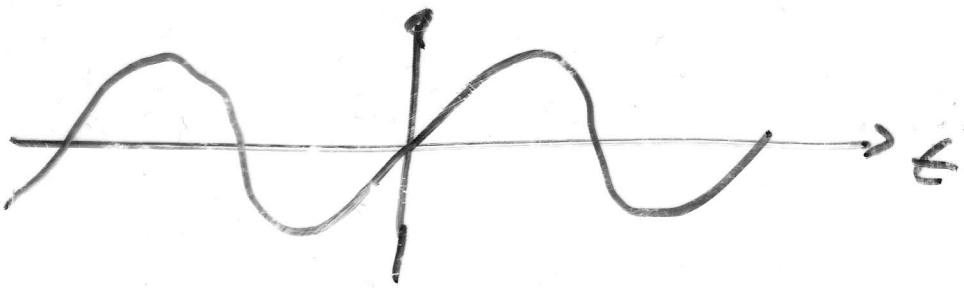
gerade Funktion $x_g(t) = x_g(-t)$

z.B. $\cos(\omega t) = \cos(-\omega t)$



ungerade Funktion $x_u(t) = -x_u(-t)$

z.B. $\sin(\omega t) = -\sin(-\omega t)$



Integration:

$$\int_{-\infty}^{\infty} x_g(t)\,dt = 2 \cdot \int_{0}^{\infty} x_g(t)\,dt$$

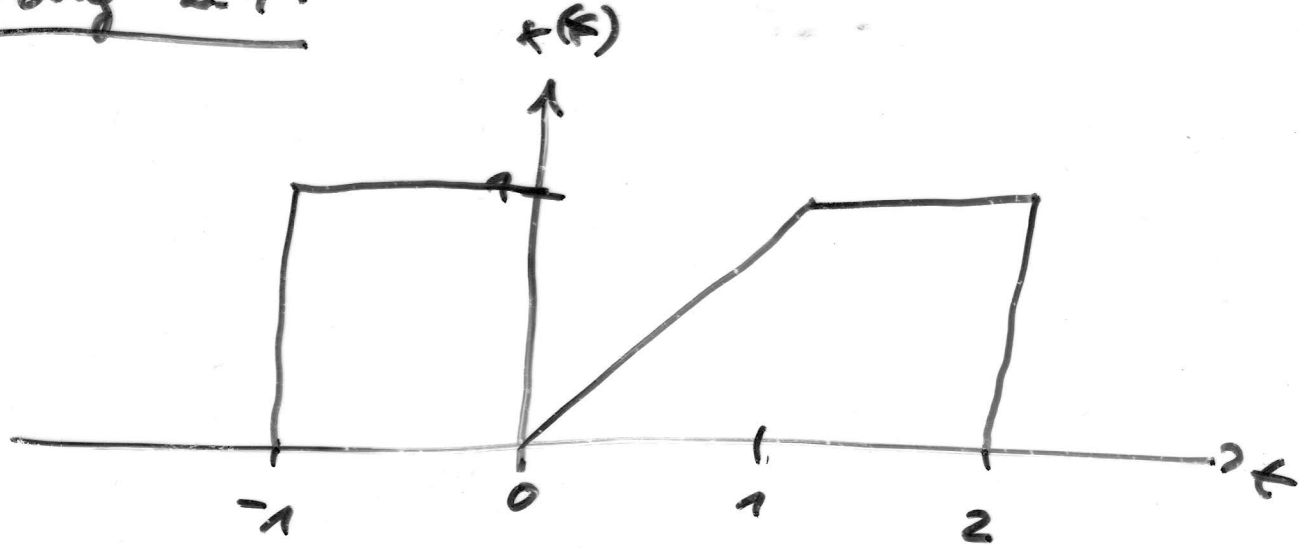
$$\int_{-\infty}^{\infty} x_u(t)\,dt = 0$$

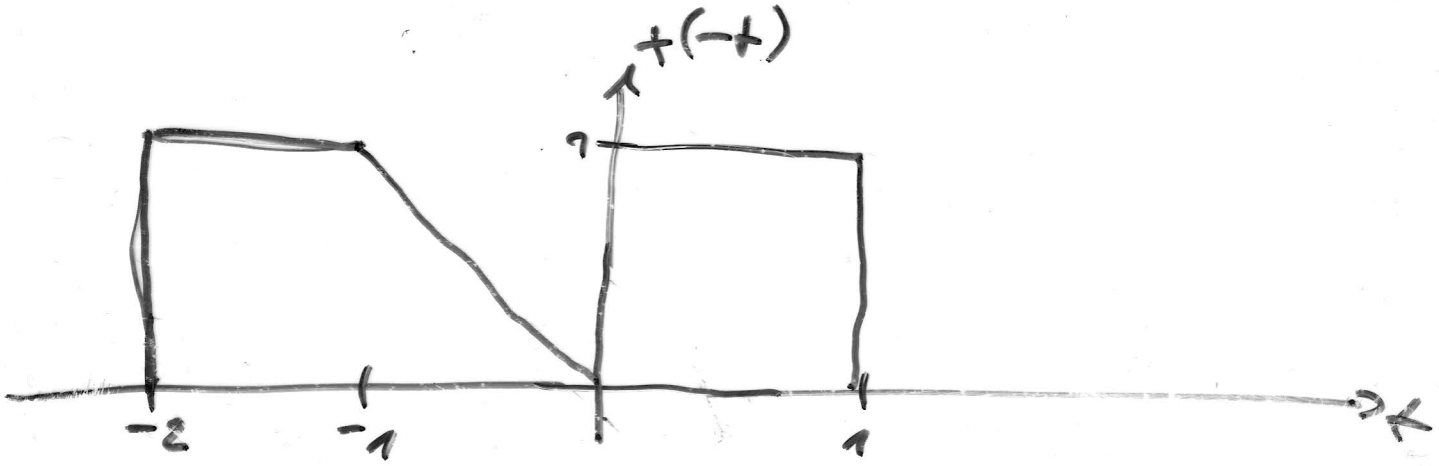
Zerlegung:

$$x(t) = \frac{x(t)}{2} + \frac{x(t)}{2} + \frac{x(-t)}{2} - \frac{x(-t)}{2}$$

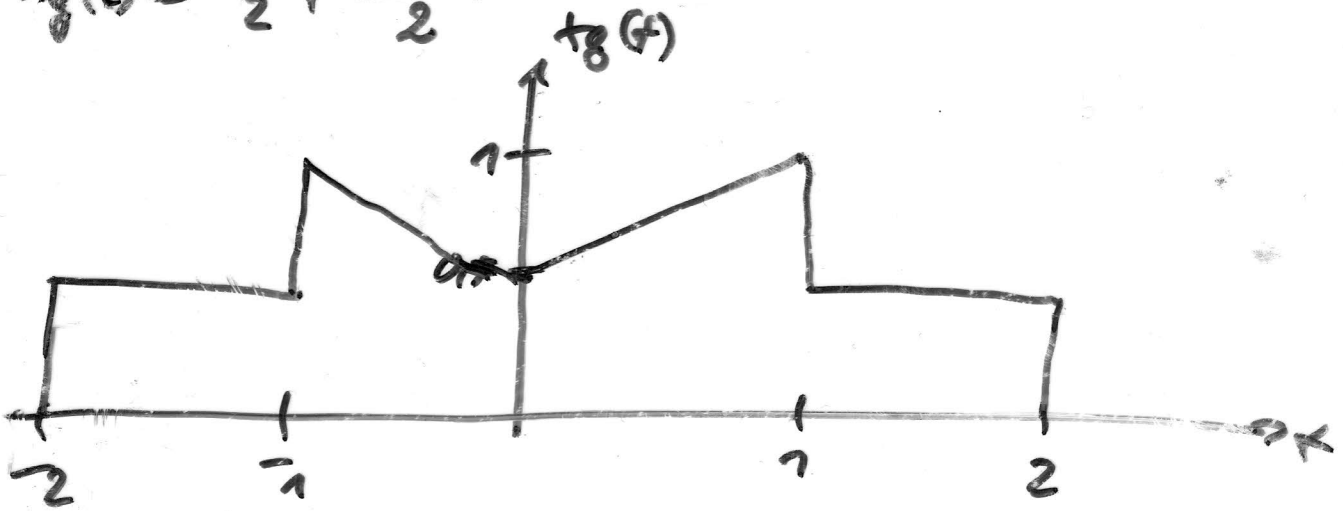
$$= \underbrace{\frac{x(t)}{2} + \frac{x(-t)}{2}}_{x_g(t)} + \underbrace{\frac{x(t)}{2} - \frac{x(-t)}{2}}_{x_u(t)}$$

Übung 24.

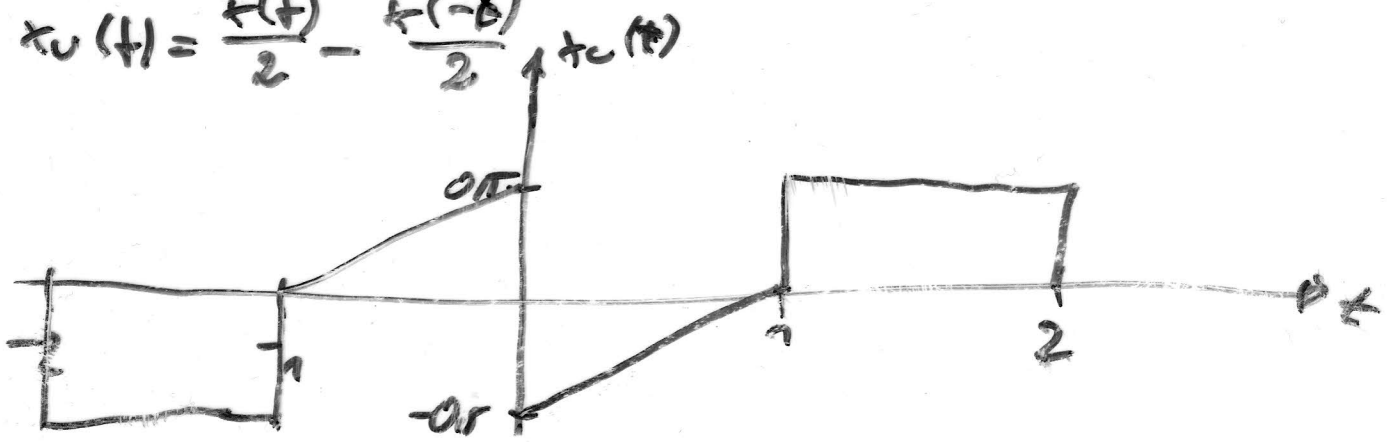




$$x_g(t) = \frac{x(t)}{2} + \frac{x(-t)}{2}$$

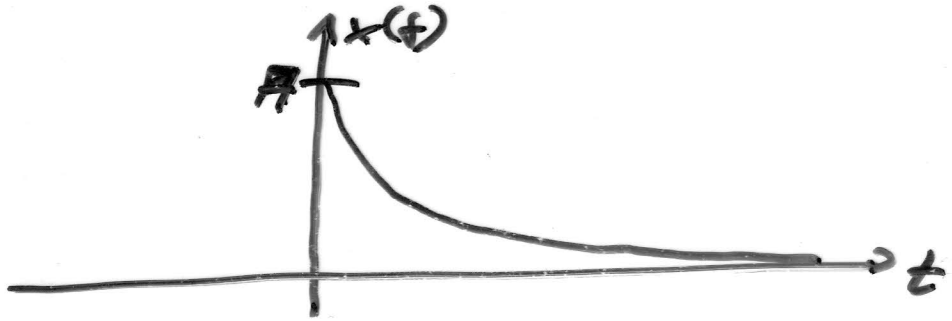


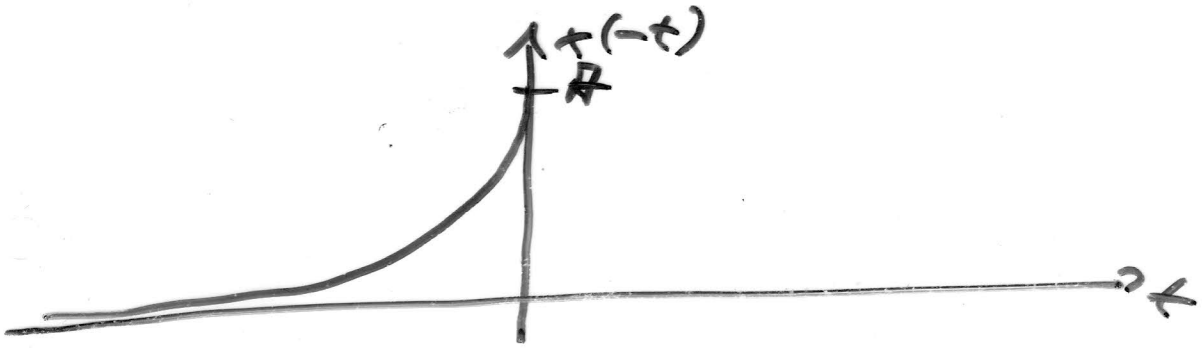
$$x_u(t) = \frac{x(t)}{2} - \frac{x(-t)}{2}$$



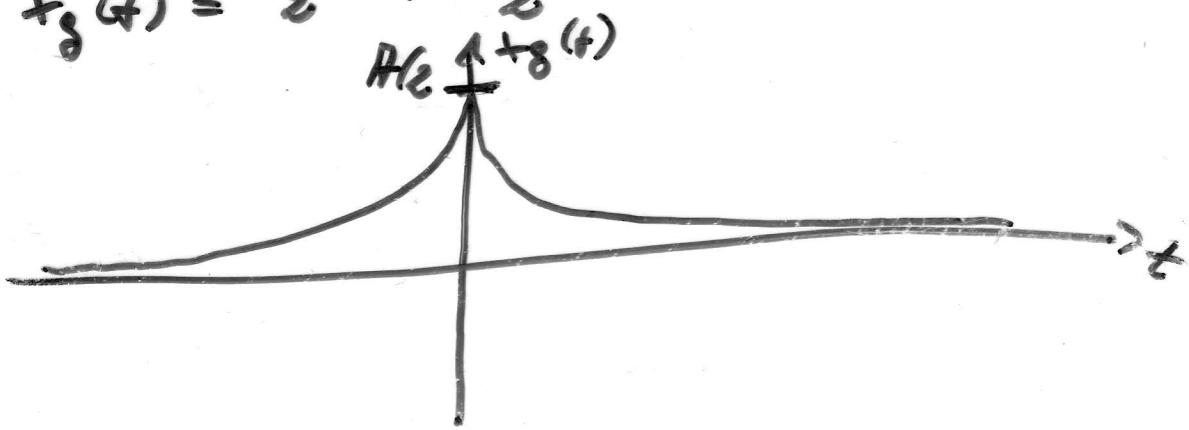
Beispiel:

$$x(t) = A \cdot e^{-t/\tau} \cdot \sigma(t)$$





$$x_g(t) = \frac{x(t)}{2} + \frac{x(-t)}{2}$$



$$x_u(t) = \frac{x(t)}{2} - \frac{x(-t)}{2}$$