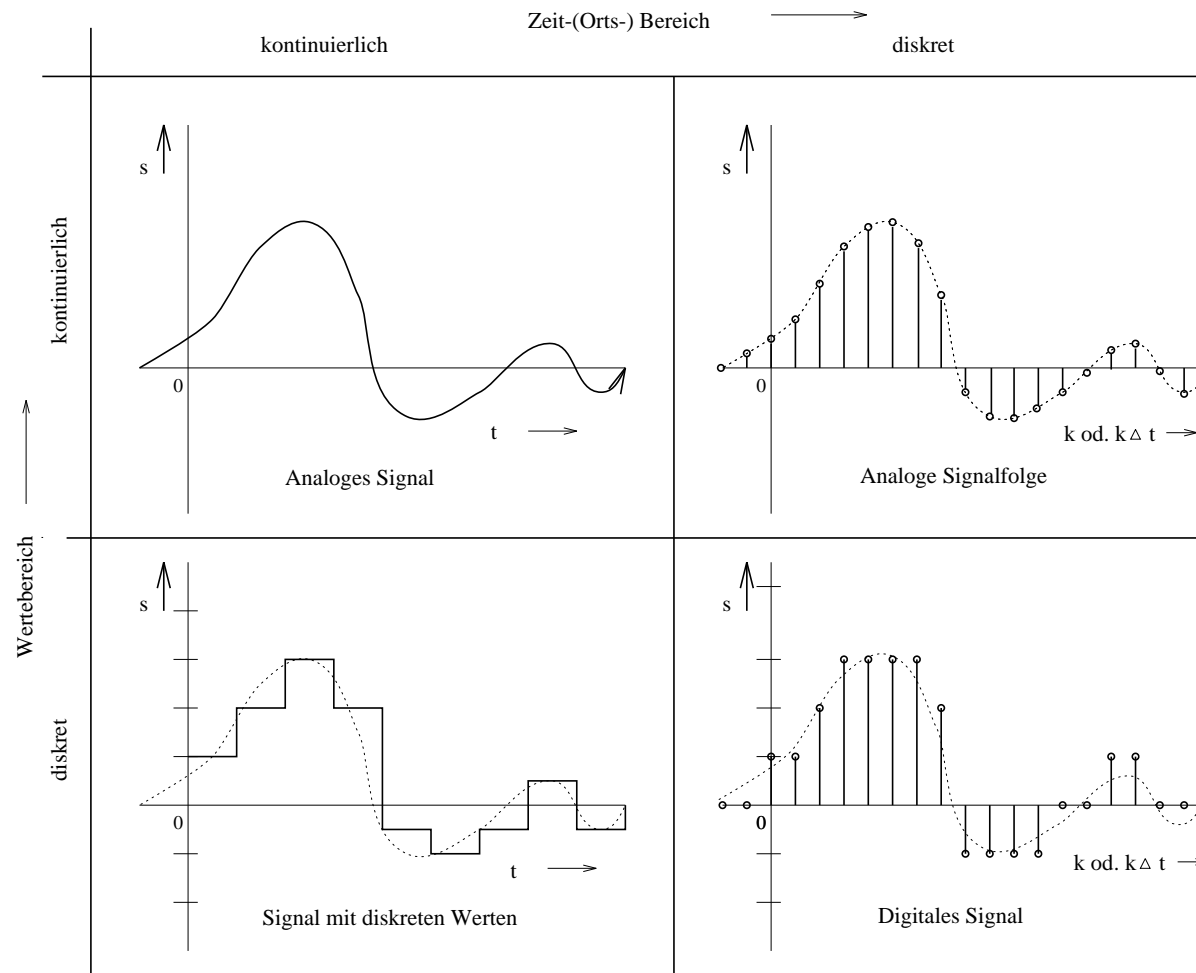


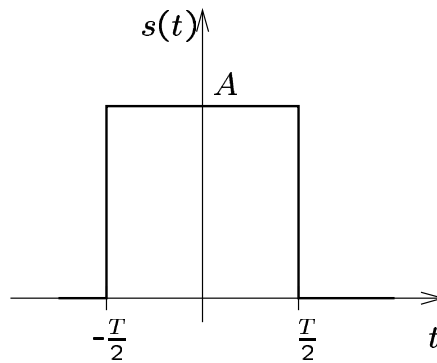
# Seminar “Grundlagen der Nachrichtentechnik 2”

## Seminarversuch 2: “Signalparameter im Zeit- und Frequenzbereich”

1. Zeit- und Werteigenschaften von Signalen
2. Prinzip der Abtastung und Quantisierung analoger Signale





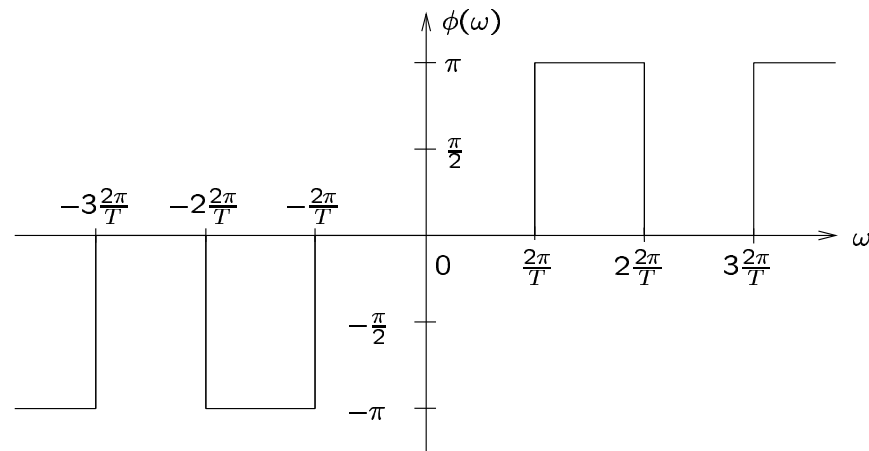
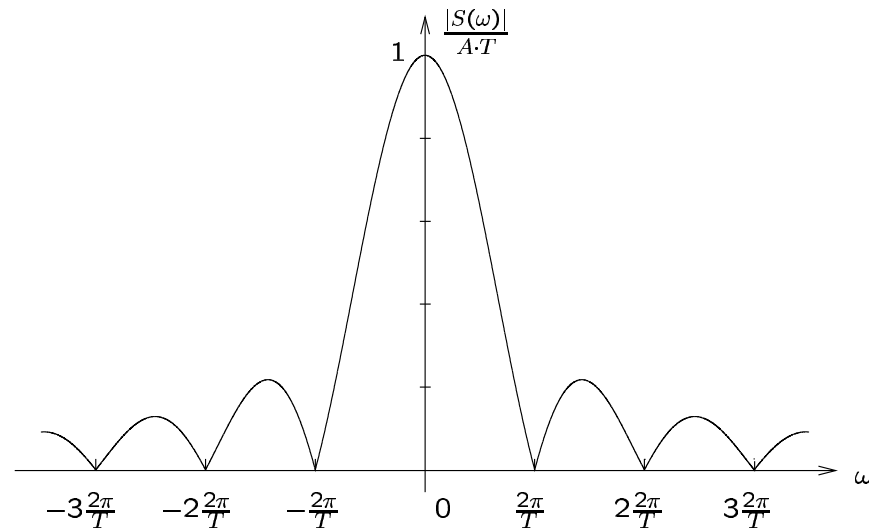


$$s_p(t) = \sum_{n=-\infty}^{\infty} s(t - nT_0), \quad \text{wobei } T \leq T_0$$

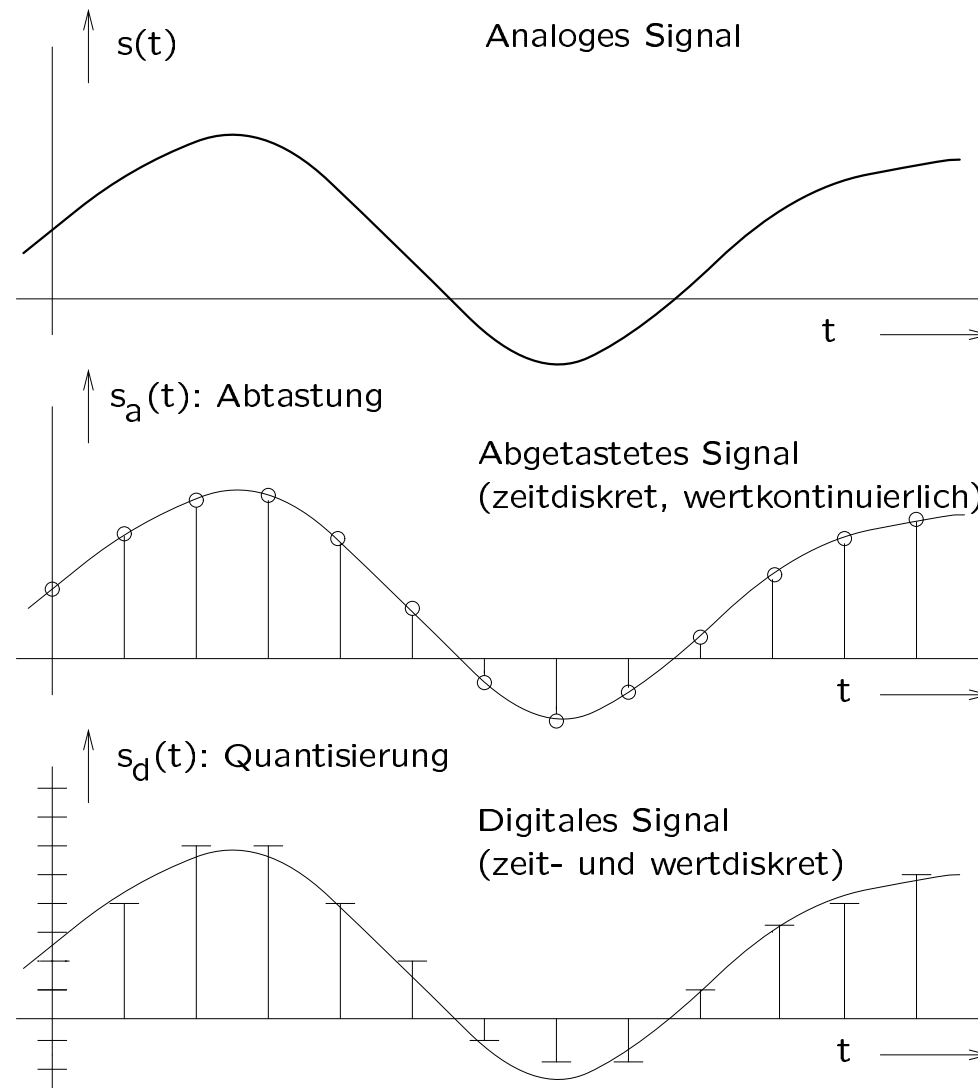
$$= \sum_{n=-\infty}^{+\infty} \underline{c}_n e^{jn\omega_0 t} \quad \text{mit } \underline{c}_n = \frac{1}{T_0} \int_{\frac{T_0}{2}}^{\frac{T_0}{2}} s(t) e^{-jn\omega_0 t} dt, \quad \omega_0 = \frac{2\pi}{T_0}$$

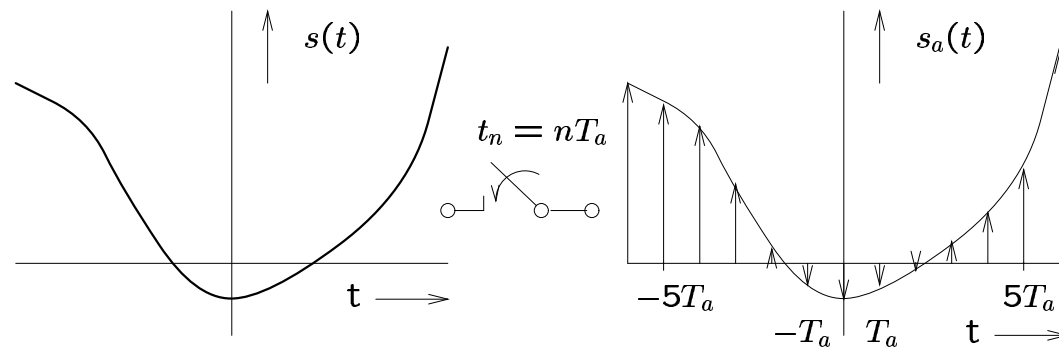
$$S(\omega) = \int_{-\infty}^{+\infty} s(t) e^{-j\omega t} dt = \int_{-\frac{T_0}{2}}^{+\frac{T_0}{2}} s(t) e^{-j\omega t} dt$$



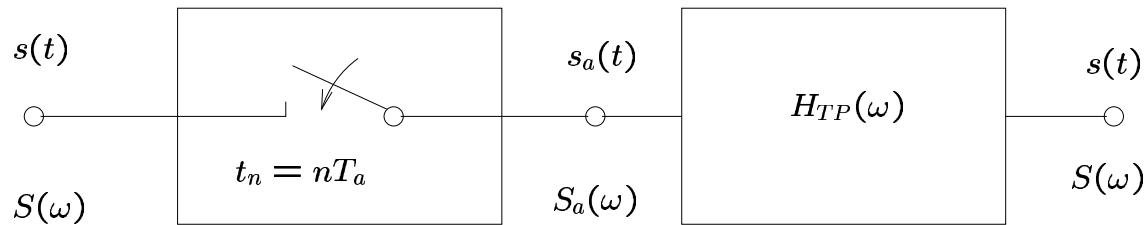


Betrags- und Phasenspektrum der Funktion  $s(t)$





”Ideale” Abtastung eines kontinuierlichen Signals



$$s_a(t) = s(t) \cdot \sum_{n=-\infty}^{\infty} \delta(t - nT_a) = \sum_{n=-\infty}^{\infty} s(nT_a) \delta(t - nT_a)$$

$$S_a(\omega) = \frac{1}{T_a} \cdot S(\omega) * \sum_{n=-\infty}^{\infty} \delta(\omega - n\omega_a)$$

$$H_{TP}(\omega) = \begin{cases} T_a & |\omega| \leq \omega_g \\ 0 & \text{sonst} \end{cases},$$



