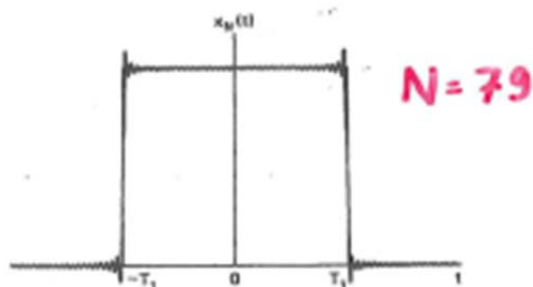
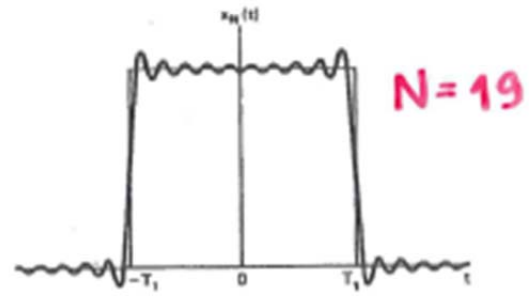
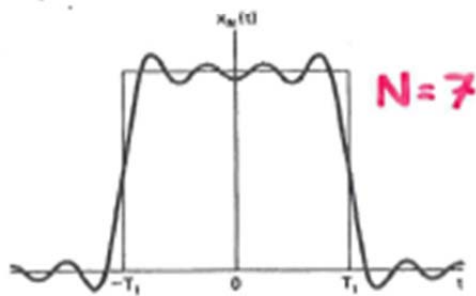
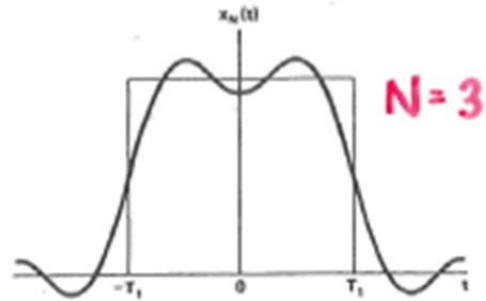
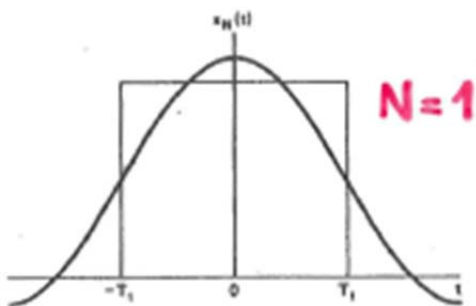


# Fourier-Synthese einer periodischen Rechtecksfunktion

$$x_N(t) = \frac{a_0}{2} + \sum_{k=1}^N ( a_k \cdot \cos(k\omega_0 t) + b_k \cdot \sin(k\omega_0 t) )$$



# Fourier-Analyse / Spektrum

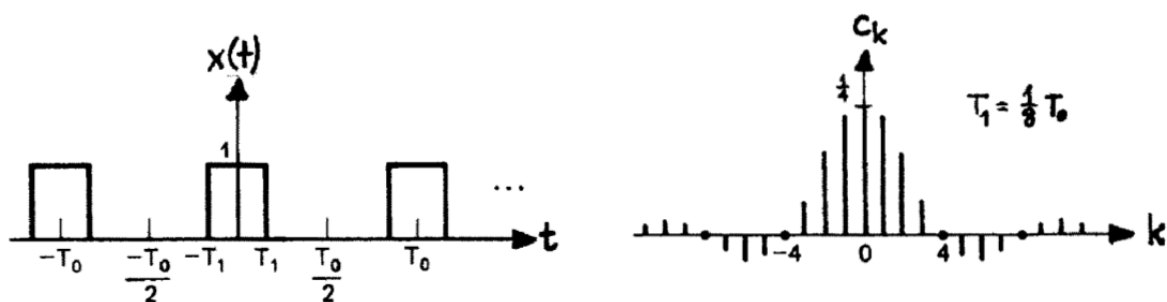
## $x(t)$ periodisch

Grundperiode	$T_0$
Grundfrequenz	$f_0 := \frac{1}{T_0}$
Grundkreisfrequenz	$\omega_0 := 2\pi \cdot f_0$

## Fourier-Reihe

$$\begin{aligned}x(t) &= \hat{x}_0 + \sum_{k=1}^{\infty} \hat{x}_k \cdot \sin(k\omega_0 t + \varphi_k) \\ &= \sum_{k=-\infty}^{\infty} c_k \cdot e^{jk\omega_0 t}\end{aligned}$$

## Spektrum **diskret**



# Fourier-Analyse / Spektrum

**$x(t)$  aperiodisch**

## Fourier-Integral

$$x(t) = \frac{1}{2\pi} \int_{-\infty}^{\infty} X(\omega) \cdot e^{j\omega t} d\omega$$

Spektrum **kontinuierlich**

