GRNVS SS21

Tutorium 02

26./27.04.2021

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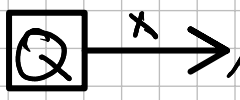
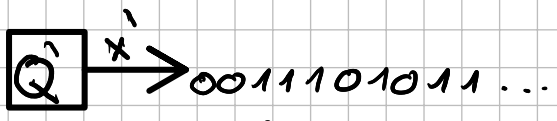


Sendet stets A

Information: $J(x) = -\log_2(\underbrace{Pr[x=A]}_{100\% = 1.0}) = -\log_2(1) = \underline{0\ bit}$



$Pr[x=0] = 0,5$ $\quad J(0) = -\log_2(0,5) = \underline{1\ bit}$

$Pr[x=1] = 0,5$ $\quad J(1) = -\log_2(0,5) = \underline{1\ bit}$

Mittlerer Informationsgehalt

$$H(x) = \sum_{x \in X} p(x) \cdot J(x) = \sum_{x \in \{0,1\}} p(x) \cdot J(x) = \underbrace{0,5 \cdot 1bit}_{x=0} + \underbrace{0,5 \cdot 1bit}_{x=1}$$

$$= 0,5 + 0,5 = 1 \ \frac{bit}{Zeichen}$$

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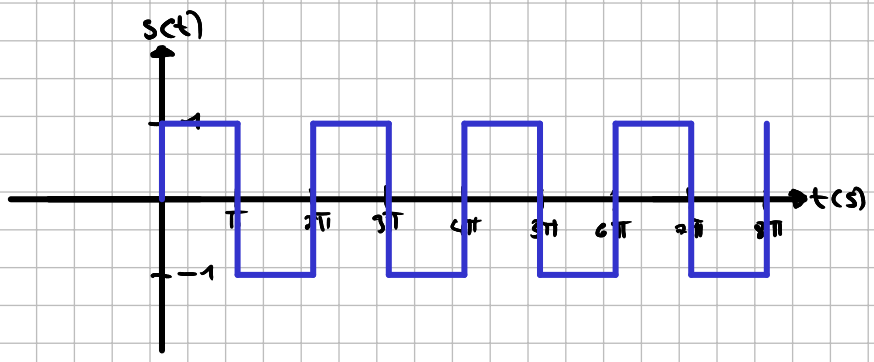
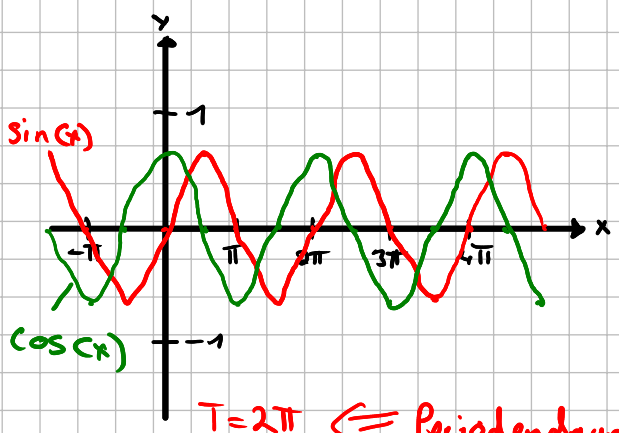
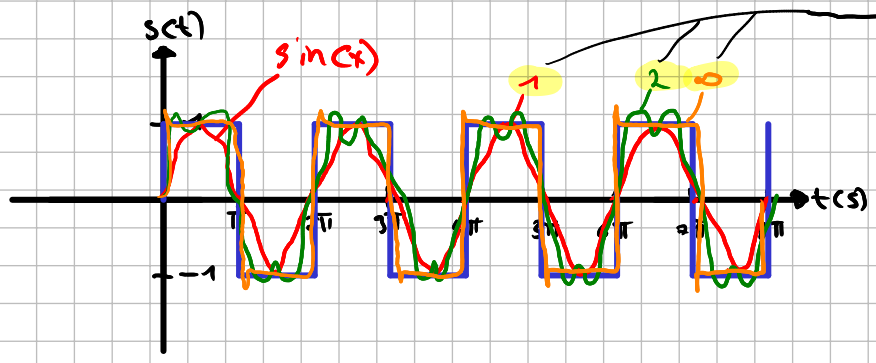
Fourierreihe:





$T = 2\pi$ ⇐ Periodendauer

⇒ Normierung der Periodendauer normal $\frac{2\pi}{T}$



$$s(t) = \frac{a_0}{2} + \sum_{k=1}^{\infty} \left[a_k \cdot \cos(k \cdot \omega \cdot t) + b_k \cdot \sin(k\omega t) \right]$$

Gleichanteil

⇒ a_0 bestimmt den Gleichanteil

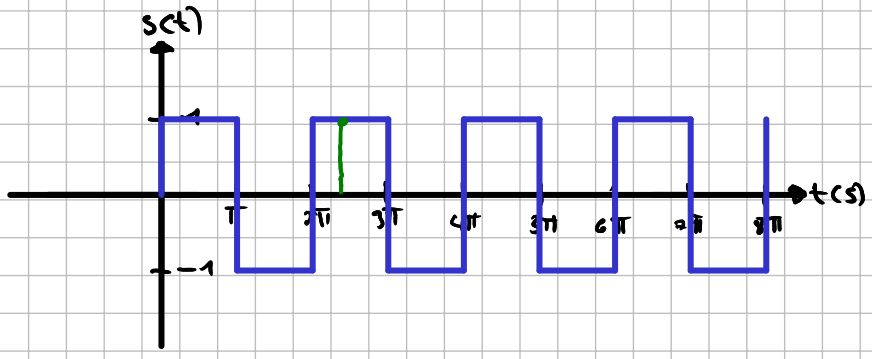
$\Rightarrow a_k = 0 \quad , b_k > 0$

da nur sin(x) anteile relevant

$$a_k = \frac{2}{T} \cdot \int_0^T s(t) \cdot \cos(k\omega t)\, dt$$

$$b_k = \frac{2}{T} \cdot \int_0^T s(t) \cdot \sin(k\omega t)\, dt$$

Aufbau eines Signales:



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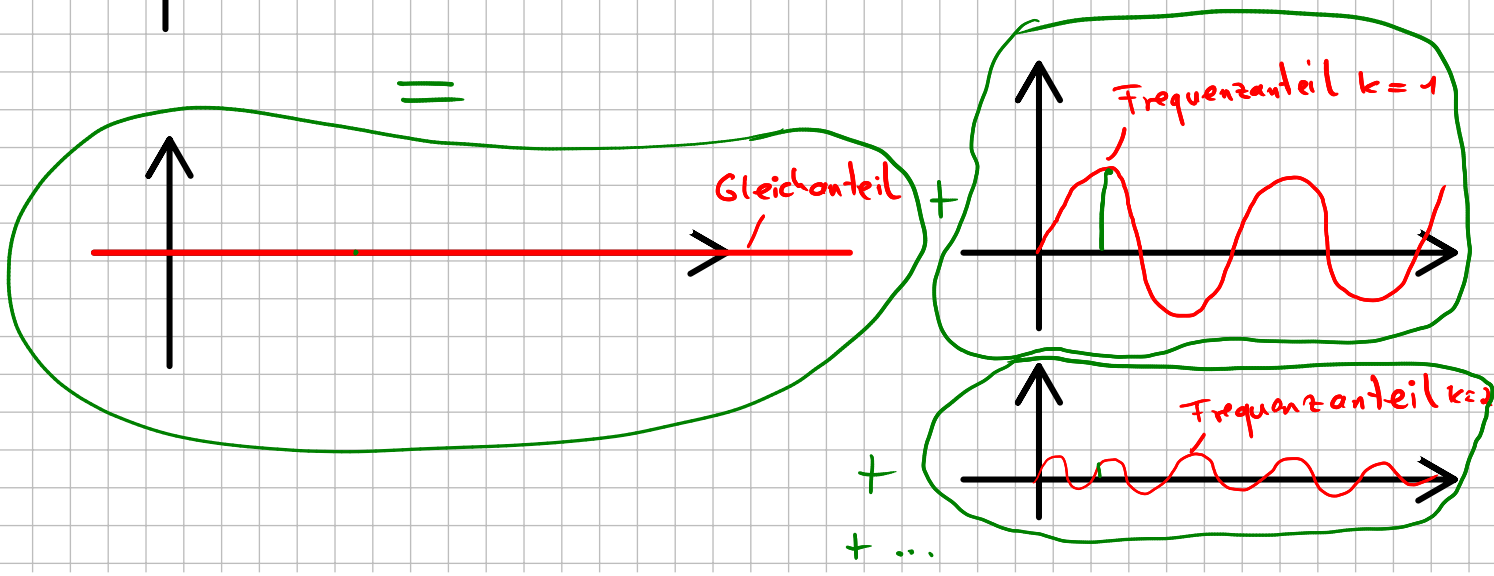

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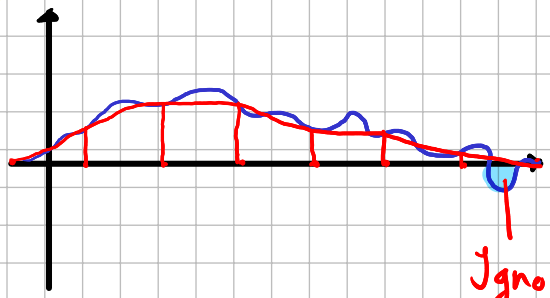
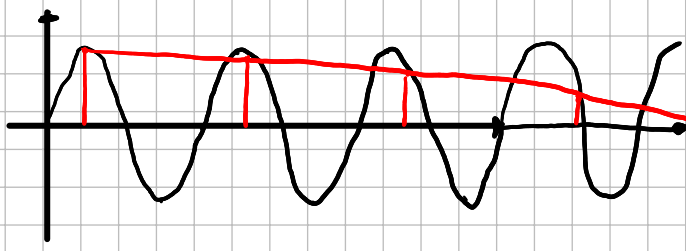
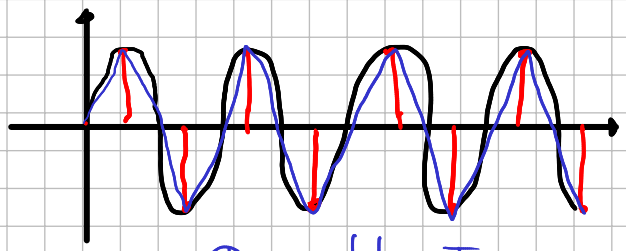


Ignoriert?



Abtasten min. mit doppelter Frequenz.!

⇒ Abtasttheorem von Shannon und Nyquist



⇒ Doppelter Frequenz abgetastet