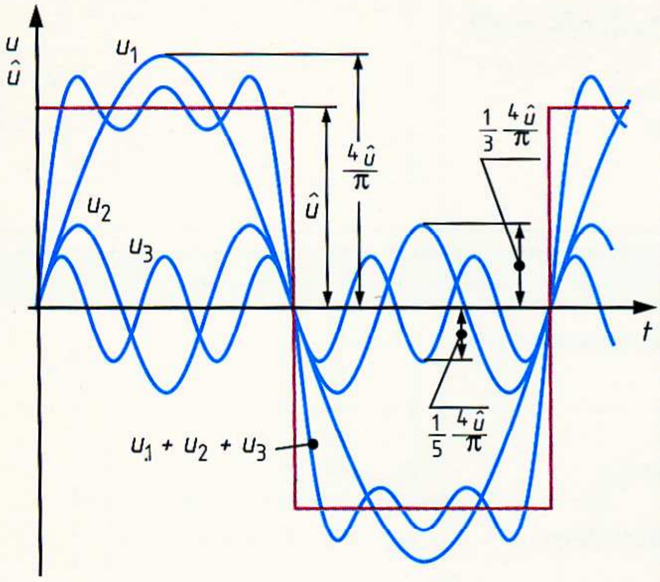
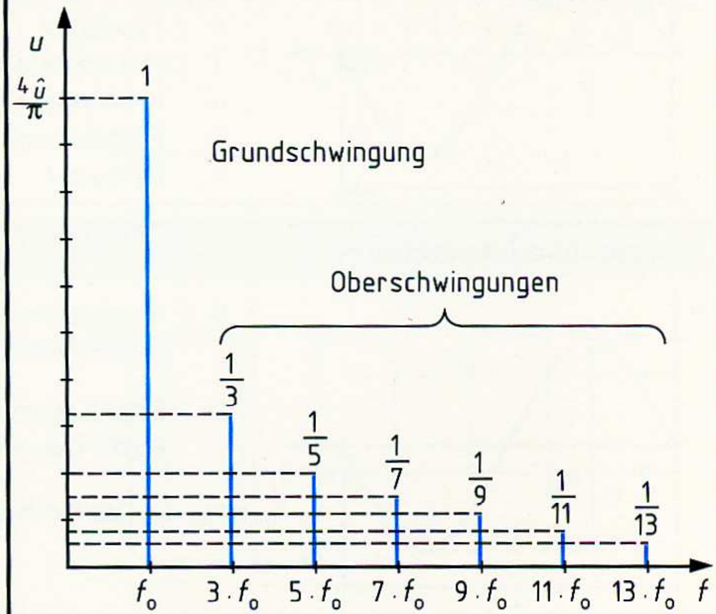
Fourier-Analyse

Linienspektrum

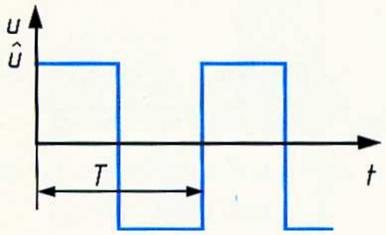


Frequenzspektrum

Jede periodische Schwingung kann als Summe von sinusförmigen Teilschwingungen dargestellt werden.



Funktionsgleichung : $u = \frac{4\,\hat{u}}{\pi}\left(\sin \omega t + \frac{1}{3}\sin 3\,\omega t + \frac{1}{5}\sin 5\,\omega t + \frac{1}{7}\sin 7\,\omega t\ \ t + \ldots\right)$; $\omega = 2\pi \cdot f$



$\bar{u} = 0$

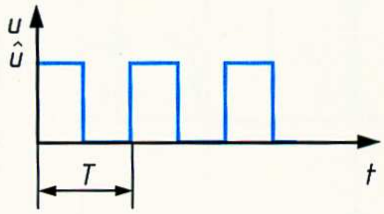
$|\bar{u}| = \hat{u}$

$U = \hat{u}$

$F_{Crest} = 1$

$F = 1$

$u = \frac{4\,\hat{u}}{\pi}\left(\sin \omega t + \frac{1}{3}\sin 3\,\omega t + \frac{1}{5}\sin 5\,\omega t + \ldots\right)$



$\bar{u} = \frac{\hat{u}}{2}$

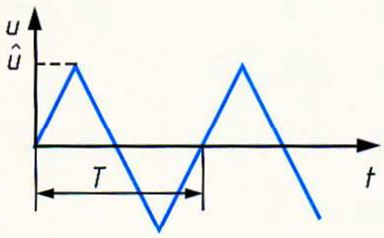
$|\bar{u}| = \frac{\hat{u}}{2}$

$U = 0{,}707 \cdot \hat{u}$

$F_{Crest} = 1{,}41$

$F = 1{,}41$

$u = \frac{\hat{u}}{2} + \frac{2\,\hat{u}}{\pi} \cdot \left(\sin \omega t + \frac{1}{3}\sin 3\,\omega t + \frac{1}{5}\sin 5\,\omega t + \ldots\right)$



$\bar{u} = 0$

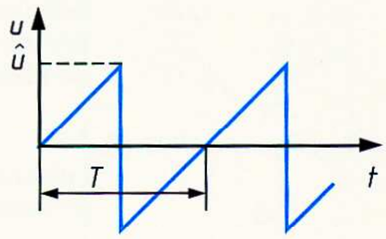
$|\bar{u}| = \frac{\hat{u}}{2}$

$U = \frac{\hat{u}}{\sqrt{3}}$

$F_{Crest} = \sqrt{3}$

$F = 1{,}547$

$u = \frac{8\,\hat{u}}{\pi}\left(\sin \omega t - \frac{1}{9}\sin 3\,\omega t + \frac{1}{25}\sin 5\,\omega t - + \ldots\right)$



$\bar{u} = \frac{\hat{u}}{2}$

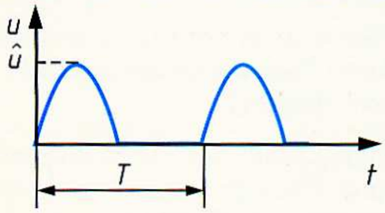
$|\bar{u}| = \frac{\hat{u}}{2}$

$U = \frac{\hat{u}}{\sqrt{3}}$

$F_{Crest} = \sqrt{3}$

$F = 1{,}547$

$u = \frac{2\,\hat{u}}{\pi}\left(\sin \omega t - \frac{1}{2}\sin 2\,\omega t + \frac{1}{3}\sin 3\,\omega t - + \ldots\right)$



$\bar{u} = 0{,}318\,\hat{u}$

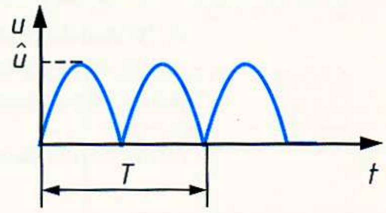
$|\bar{u}| = 0{,}318\,\hat{u}$

$U = 0{,}5\,\hat{u}$

$F_{Cres} = 2$

$F = 1{,}57$

$u = \frac{\hat{u}}{\pi} + \frac{\hat{u}}{2} \cdot \sin \omega t - 2\,\frac{\hat{u}}{\pi} \cdot \left(\frac{1}{3} \cdot \cos 2\,\omega t + \frac{1}{15}\cos 4\,\omega t + \frac{1}{35}\cos 6\,\omega t + \ldots\right)$



$\bar{u} = 0{,}637\,\hat{u}$

$|\bar{u}| = 0{,}637\,\hat{u}$

$U = \frac{\hat{u}}{\sqrt{2}}$

$F_{Cres} = \sqrt{2}$

$F = 1{,}11$

$u = \frac{2\,\hat{u}}{\pi}\left(1 - \frac{2}{3}\cos 2\,\omega t - \frac{2}{15}\cos 4\,\omega t - \frac{2}{35}\cos 6\,\omega t - \ldots\right)$