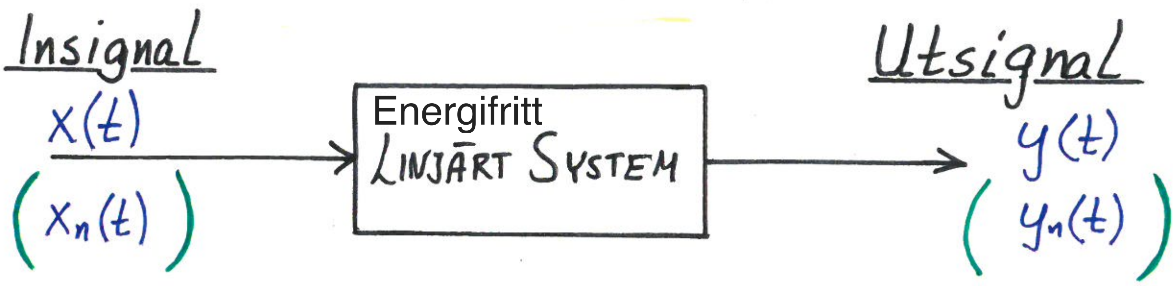
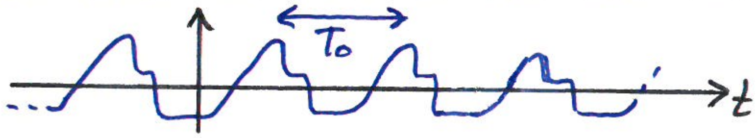


Grundläggande samband för linjära system (tas upp i HT2):

$$x(t)=\sum_n a_n\cdot x_n(t) \quad \Longrightarrow \quad y(t)=\sum_n a_n\cdot y_n(t)$$

($x_n(t)$ in $\Rightarrow$ $y_n(t)$ ut)

Periodisk insignal

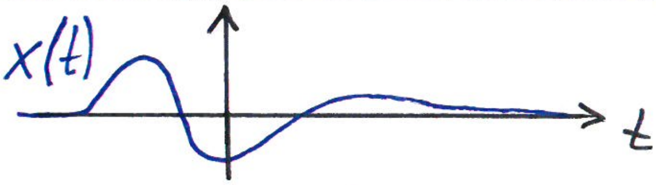


$\int_{T_0}|x(t)|\,dt<\infty \Rightarrow$ FOURIERSERIEUTVECKLA

$$x(t)=\sum_{n=-\infty}^{\infty}\underbrace{D_n}_{=a_n}\cdot\underbrace{e^{jn\omega_0 t}}_{=x_n(t)}\ ,\quad \text{där}\quad D_n=\frac{1}{T_0}\int_{T_0}x(t)e^{-jn\omega_0 t}\,dt$$

Absolutintegrerbar insignal

(Energisignal, icke-periodisk)



$\int_{-\infty}^{\infty}|x(t)|\,dt<\infty \Rightarrow$ FOURIERTRANSFORMERA

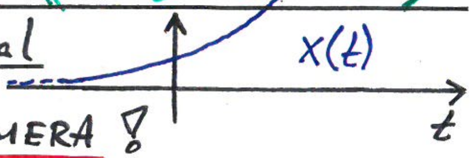
$$x(t)=\frac{1}{2\pi}\int_{-\infty}^{\infty}X(\omega)e^{j\omega t}\,d\omega\ ,\quad \text{där}\quad X(\omega)=\int_{-\infty}^{\infty}x(t)e^{-j\omega t}\,dt$$

Riemannintegral

$x_n(t)=\frac{1}{2\pi}e^{j\omega t}\,d\omega$

Motsvarar ett kontinuum av a_n (eller $\begin{cases} x_n(t)=e^{j\omega t} \\ a_n\sim\frac{1}{2\pi}X(\omega)\,d\omega\end{cases}$)

Ej absolutintegrerbar, icke-periodisk insignal



$\lim_{T\to\infty}\int_{-T/2}^{T/2}|x(t)|\,dt=\infty \Rightarrow$ LAPLACETRANSFORMERA !

$$x(t)=\frac{1}{2\pi j}\int_{\sigma-j\infty}^{\sigma+j\infty}X(s)e^{st}\,ds\ ,\quad \text{där}\quad X(s)=\int_{-\infty}^{\infty}x(t)e^{-st}\,dt$$

$s\in$ Konv.omr.!

(Man kan även Laplacetransformera energisignaler!)