Nový nadpis 6.5.2013

Připomenutí:

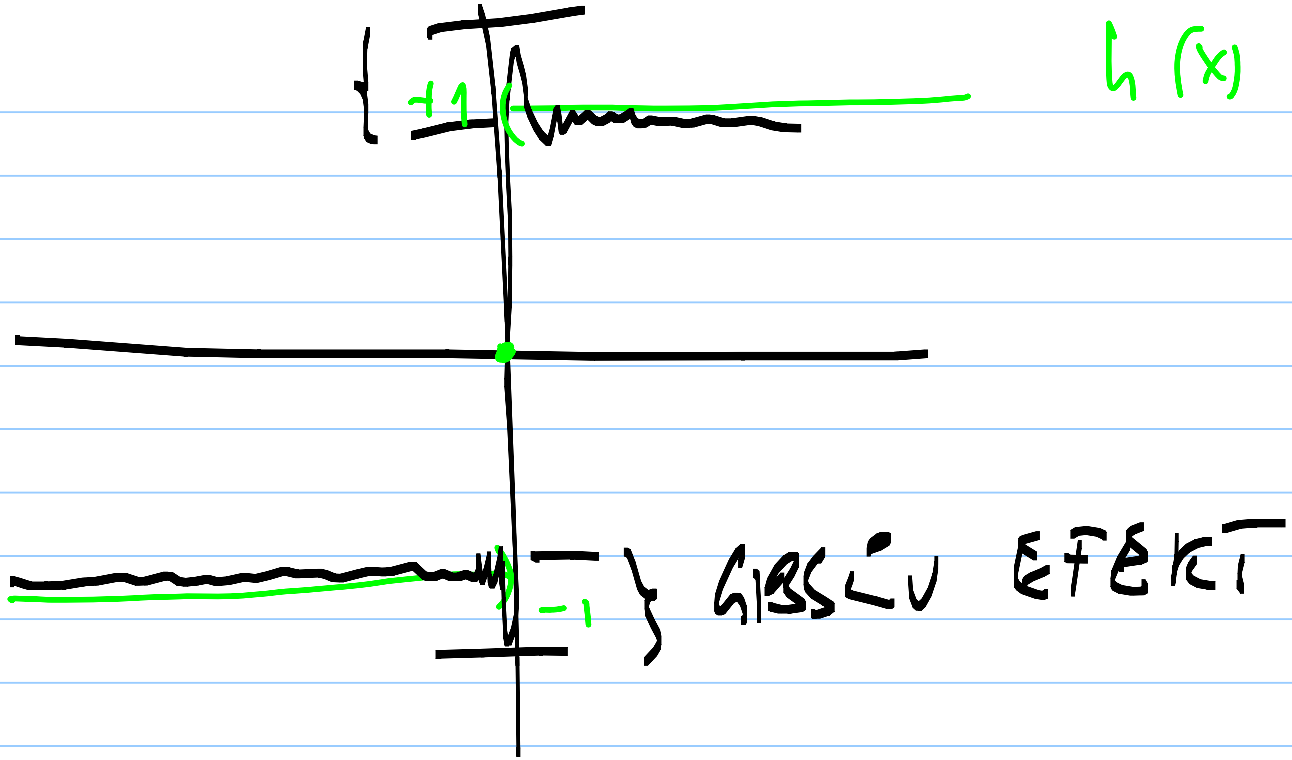
$$S_N(t) = \frac{1}{T} \sum_{k=-N}^{N} \int_{-T/2}^{T/2} f(x)\, e^{-i\omega k x}\, e^{i\omega k t}\, dx$$

$$S_N(t) = \int_{-T/2}^{T/2} K_N(t-x)\, f(x)\, dx$$

$$K_N(y) = \frac{1}{T} \sum_{k=-N}^{N} e^{i\omega k y}$$

$f*g(y)$ [illegible] [illegible] "[illegible]"

$$= \int_{-\infty}^{\infty} f(x)\, g(y-x)\, dx$$


+1
h(x)
-1
GIBBSŮV EFEKT

$$f(-x) = -f(x)$$

$$e^{-i\omega t}$$

$$\tilde{f}(\omega) = \mathcal{F}(f)(\omega) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(t)(\cos \omega t - i \sin \omega t)\, dt$$

odd

$$= \frac{-i}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(t) \sin(\omega t)\, dt$$

FOURIER SIN TRANSFORM $\tilde{f}_s(\omega) = \sqrt{\frac{2}{\pi}} \int_0^{\infty} f(t) \sin(\omega t)\, dt$

INVERSE: $f(t) = \sqrt{\frac{2}{\pi}} \int_0^{\infty} \tilde{f}_s(\omega) \sin(\omega t)\, d\omega$

$$\mathcal{L}(f)(s) = \int_0^\infty f(t)\, e^{-st}\, dt$$

$$\mathcal{L}(f'(t))(s) = \int_0^\infty f'(t)\, e^{-st}\, dt$$

$$= \left[f(t)\, e^{-st} \right]_0^\infty + s \int_0^\infty f(t)\, e^{-st}\, dt = -f(0) + s\,\mathcal{L}(f)(s)$$

$\tilde{f} = \mathcal{F}(f) = ?$ $\qquad f(t) = e^{-at^2}, \quad a > 0$

$$\mathcal{F}(f)(\omega) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-at^2} \cdot e^{-i\omega t}\, dt$$

$$(\mathcal{F}f)'(\omega) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \underbrace{-it\, e^{-at^2}}_{F'} \cdot \underbrace{e^{-i\omega t}}_{G}\, dt = \dots$$

$$= \underbrace{-\frac{\omega}{2a}}\, (\mathcal{F}f)(\omega) \Rightarrow \tilde{f}(\omega) = C \cdot e^{-\frac{\omega^2}{4a}}$$

$$C = \frac{1}{\sqrt{2a}}$$