Dagens teman

- Derivator av δ-funktioner (FM 4.2.7)
- Summa av harmoniska vågor, pulståg (FM 5.2)

Derivering av generaliserade funktioner

$$u'(t) = \delta(t), \quad \int_{-\infty}^{t} \delta(\tau)\, d\tau = u(t).$$

$$\int_{-\infty}^{\infty} \delta'(t)\, x(t)\, dt = -x'(0).$$

Allmänt:

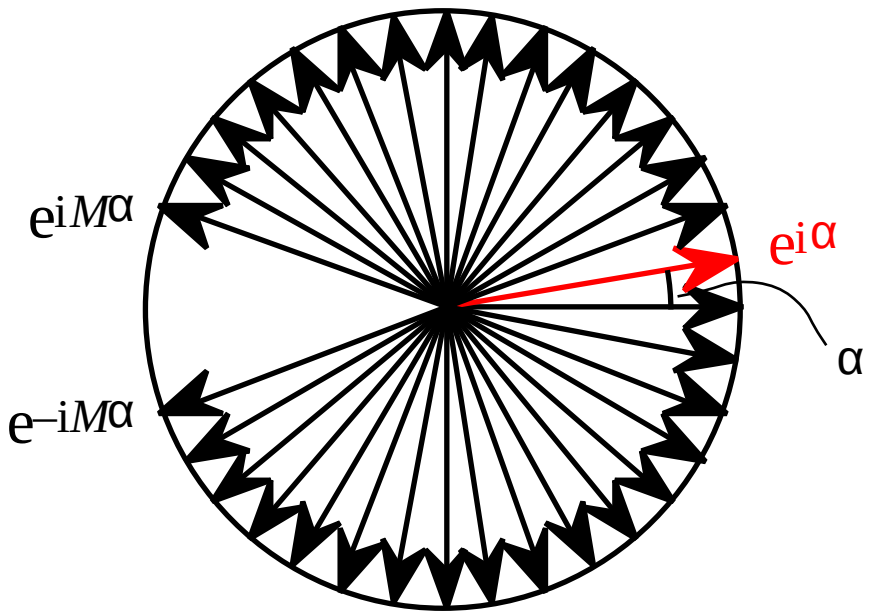
$$\int_{-\infty}^{\infty} \delta^{(n)}(t - a)\, x(t)\, dt = (-1)^n\, x^{(n)}(a).$$

Faltning med δ-pulser och dess derivator:

$$\delta'(t) * x(t) = x(t).$$

Allmänt:

$$\delta^{(n)}(t) * x(t) = x^{(n)}(t).$$



$\alpha = \pi/18 = 10°$

$M = 16,\ P = 33$

Viktiga summationer

- $$\sum_{n=-M}^{M} e^{in\omega t} = \frac{\sin P\omega t/2}{\sin \omega t/2}, \; P = 2M + 1$$

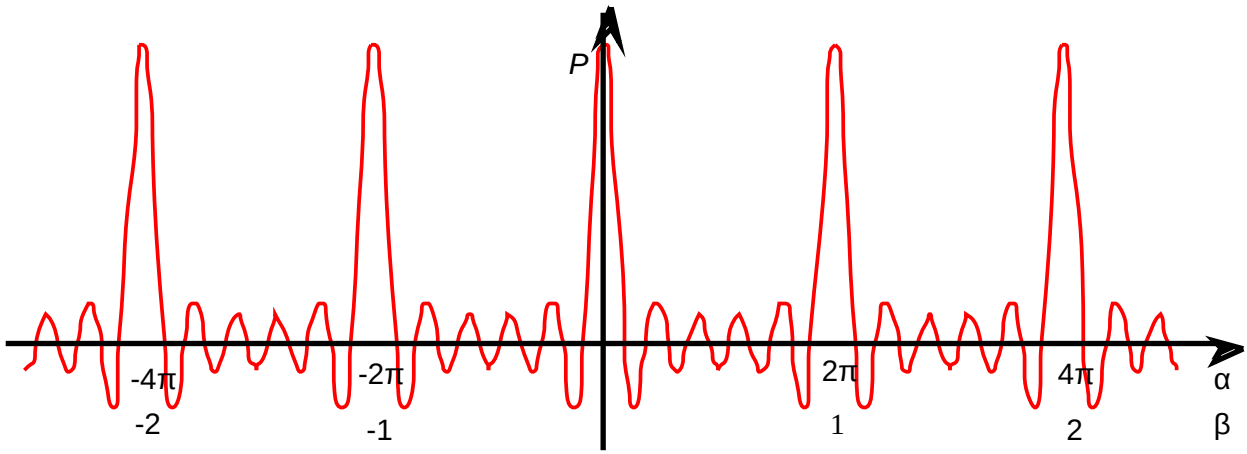
  = antalet termer

Summa av alla harmoniska signaler med heltalsfrekvenser:

- $$\sum_{n=-\infty}^{\infty} e^{2\pi i n t} = \sum_{n=-\infty}^{\infty} \delta(t - n)$$

Generellare: Summa av alla T-periodiska harmoniska signaler

- $$\sum_{n=-\infty}^{\infty} e^{2\pi i n t/T} = T \sum_{n=-\infty}^{\infty} \delta(t - nT)$$



$$\sum_{n=-M}^{M} e^{2\pi i n \beta} = \frac{\sin P\pi\beta}{\sin \pi\beta}, P = 2M + 1$$

$$\alpha = 2\pi\beta$$

Radianer Varv