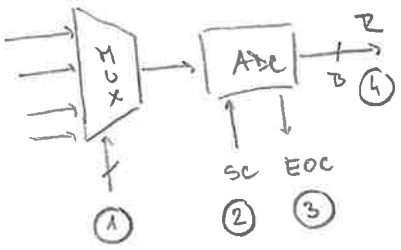
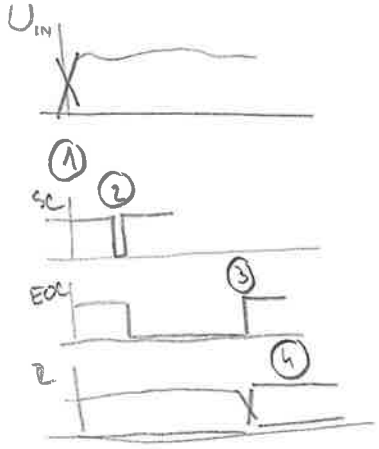
ADC

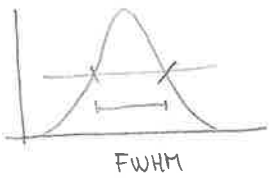




zaporedje delovanja:
- vzorči
- počakaj
- beri

lastnosti ADC

- ločljivost: v koliko predelkov razdelimo U_{IN}
  B bitov $\Rightarrow$ 2^B predelkov: 8 → 256, 12 → 4096, 16 → 65 000
  $B = 2^B \cdot \frac{U_{IN}}{doseg}$
- dejanska ločljivost: vpliva šum: konst. vh. napetost naj bi dajala konst. B

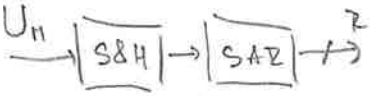


histogram

- območje: navedeno velikostjo na referenčno napetost $\Rightarrow$ izberi U_{REF} že en mux.

$$LSB = \frac{doseg}{2^B}$$

- kodiranje:
- čas konverzije (EOC je nizko) sestavljen iz $T_{ZAJEMA} + T_{KONVERZIJE}$
  ⇓ S&H, ⇓ pretvorba



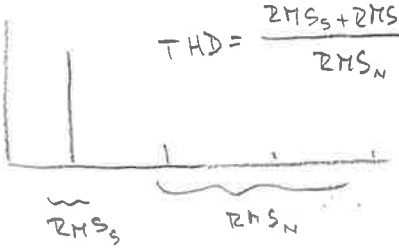
oboje definira cel ≡ že en multiplexer

- linearnost: integralska, diferenčna

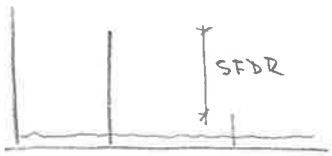
- SNR

- THD

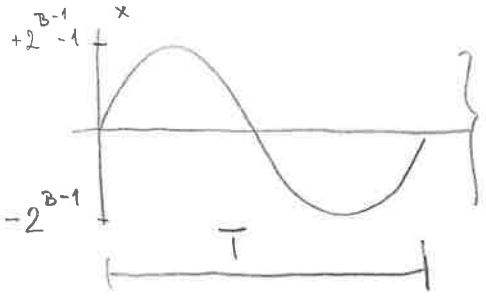
$$THD = \frac{RMS_S + RMS_N}{RMS_N}$$



- SFDR



napaka čese vrtečnja



$x = LSB \cdot 2^{B-1} \sin \omega t \quad ; \omega = \frac{2\pi}{T}$

največja napaka < 1LSB !

napaka : $\dot{x} = \omega 2^{B-1} \cos \omega t$

$$\Delta_{max} = 1 = \dot{x} \cdot \Delta t \Big|_{\cos \omega t = 1} = \frac{2\pi}{T} 2^{B-1} \cdot \Delta t$$

$$\Delta t = \frac{T}{\pi \cdot 2^B}$$

T	8bit	16bit	
1s	1.2ms	4.8µs	
1µs	1.2ns	4.8ps	!

≡

obnova: uvod v vzorčenje

Fourier

$$x(t) \longleftrightarrow X(\omega)$$

$$x(t) \xrightarrow{F} F(x(t)) \Rightarrow c_k \quad \text{za periodičen } x(t)$$

$$c(i\omega) \quad \text{za neperiodičen } x(t)$$

periodično

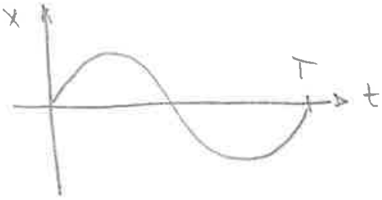
tja: $$F(x(t)) = c_k = \frac{1}{T}\int_{-T/2}^{T/2} x(t)\cdot e^{-ik\omega t}\,dt$$

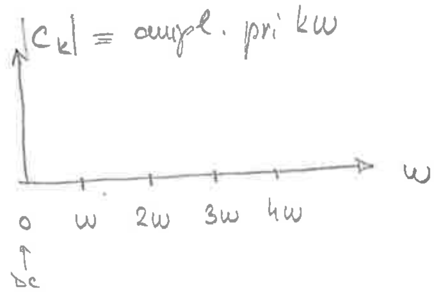
mejí ≡ faza

c_k ≡ kompleksen: cos i sin

nazaj: $$x(t) = \sum_k c_k e^{ik\omega t}$$ ω: $2\pi f = \frac{2\pi}{T}$

samo realni del!





ω: diskretna

neperiodično

tja: $$F(x(t)) = c(i\omega) = \int_{-\infty}^{\infty} x(t)\, e^{-i\omega t}\,dt$$

ω: zvezna

nazaj: $$x(t) = \frac{1}{2\pi}\int_{-\infty}^{\infty} c(i\omega)\, e^{i\omega t}\,d\omega$$

samo realni del!