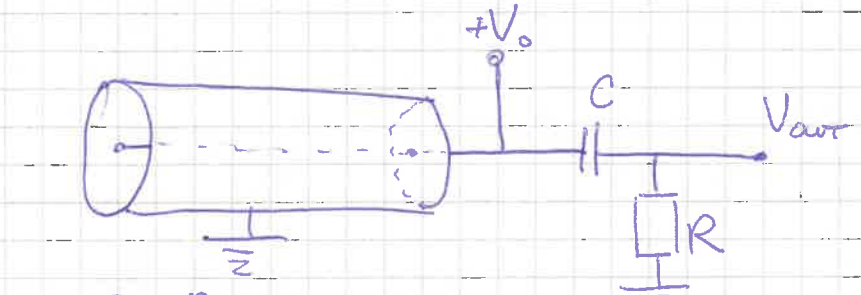
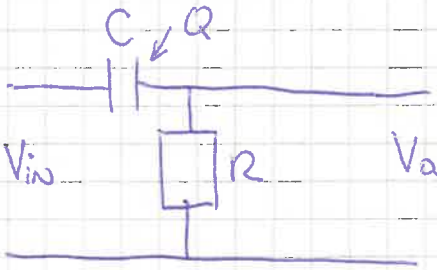
OBDELAVA SIGNALA IZ CILINDRIČNE ŠTEVCA ACI IZ VEČZIONE PROP. VOTORE





$$V_{IN} - \frac{Q}{C} - \underbrace{IR}_{V_{OUT}} = 0$$

$$V_{IN} = \frac{Q}{C} + V_{OUT} \quad \Big| \cdot \frac{d}{dt}$$

$$\frac{dV_{IN}}{dt} = \frac{1}{C}\frac{dQ}{dt} + \frac{dV_{OUT}}{dt}$$

$$\frac{dV_{IN}}{dt} = \frac{1}{C} I + \frac{dV_{OUT}}{dt}$$

$$V_{OUT} = IR$$

$$\frac{dV_{IN}}{dt} = \frac{V_{OUT}}{RC} + \frac{dV_{OUT}}{dt}$$

CILINDRIČNI ŠTEVEC

$$V_{IN} = u(t) = -\frac{1}{4\pi\varepsilon_0 \ell} \ln\left(1+\frac{t}{t_0}\right)$$

$$= -k \ln\left(1+\frac{t}{t_0}\right)$$

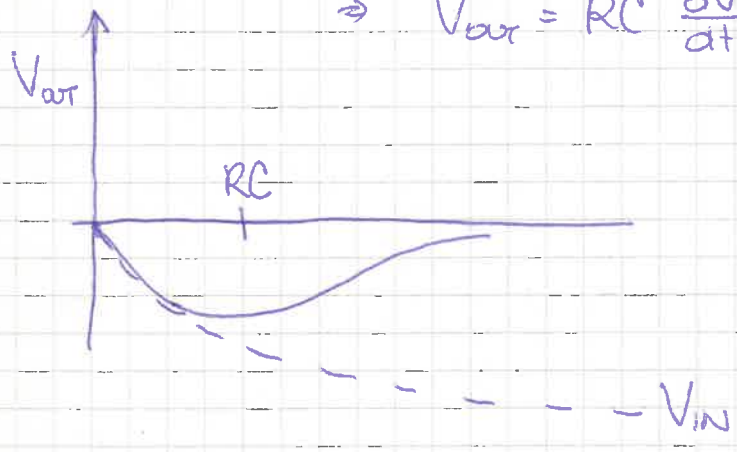
DIFERENCIRA, POSEBNO LIMITI:

za $t=0$ $V_{IN}=0$ in $V_{OUT}=0$

za $t \ll RC$ $\frac{dV_{IN}}{dt} \approx \frac{dV_{OUT}}{dt} \Rightarrow V_{IN} = V_{OUT}$

za $t \gg RC$ $\frac{V_{OUT}}{RC} \gg \frac{dV_{OUT}}{dt}$

$$\Rightarrow V_{OUT} = RC\frac{dV_{IN}}{dt} = -kRC\frac{1}{t_0}\frac{1}{1+\frac{t}{t_0}}$$



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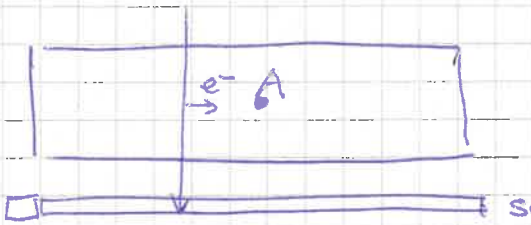
DRIFT (POTOVALNA) KOMORA

IZZIV: RESOLUCIJA DOLOČENA Z d (1–2 mm) → RAZDALJA MED ŽICAMI

BOLJŠA RESOLUCIJA → DRUGAČEN PRISTOP

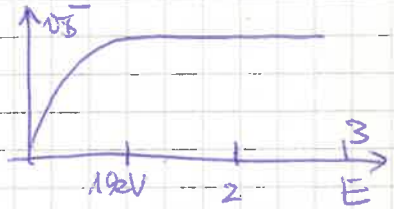


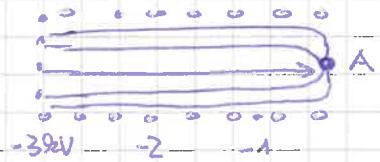
MERIMO ČAS POTOVANJA e^- OD SLEDI DELCA DO ANODE
- $t_{zač}$: SCINTILATOR
- t_{konec}: PLAZ NA ANODI.

$$x = \int v_D(t)\,dt$$

KER $v_D = v_D(E)$ JE UGODNO, ČE
- E KONST ALI PA
- v_D NEODVISEN OD E

RECIMO: STA



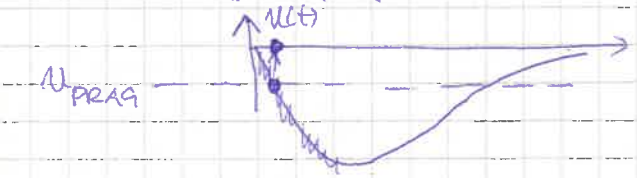


RESOLUCIJA DRIFT KOMORE

- DIFUZIJA: ELEKTRONSKI OBLAK SE KRČEVITO V GAUSSOVO PORAZDELITEV

$$\sigma_x \propto \sqrt{Dt} \propto \sqrt{x}$$

- ELEKTRONIKA: NEODVISNO OD x

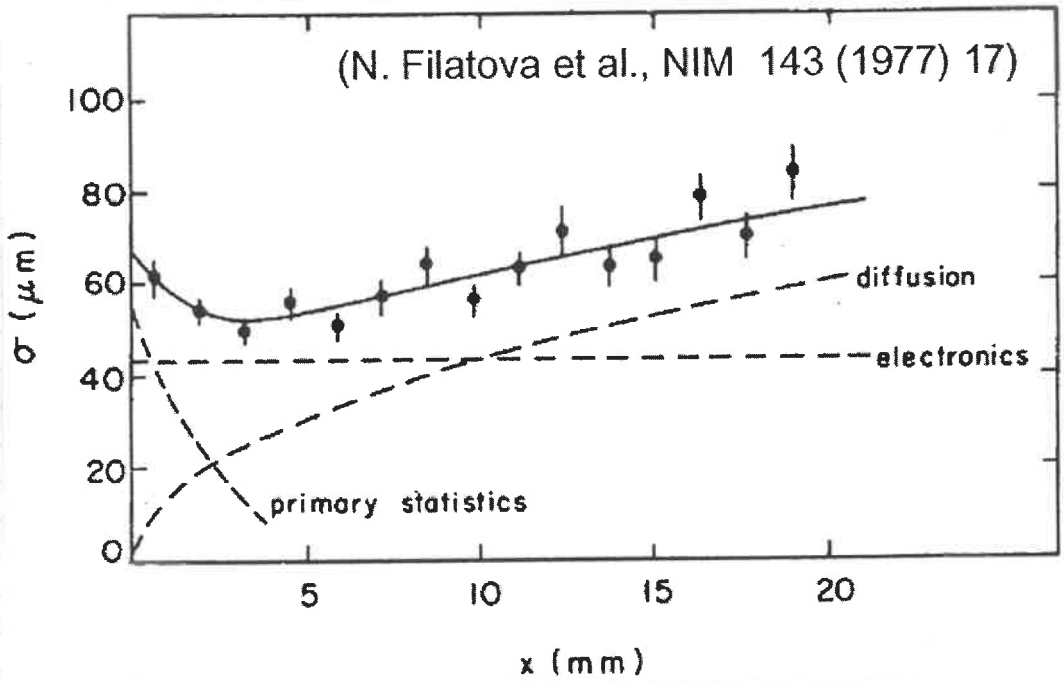


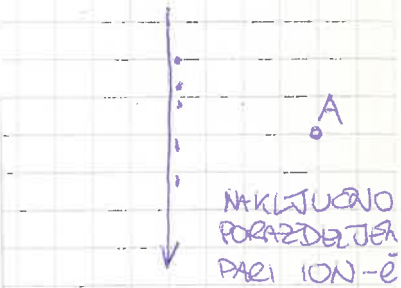
NAPAKA PRI MERITVI ČASA ZARADI ŠUMA

$$\sigma_t = \sigma_v \cdot \left(\frac{dU}{dt}\right)^{-1}$$

↑ŠUM

- PRIMARNA STATISTIKA: ZRNATOST SLEDI, KI JO POSTI DELEC





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(2a) - DODATEK

SPLOŠNA REŠITEV DIF. ENAČBE

OZNAKE $\tau = RC$, $K = \frac{1}{4\pi\varepsilon_0 \ell^2}$

$$V_{OUT}' + \frac{1}{\tau} V_{OUT} = -K \frac{1}{t_0} \frac{1}{(1 + t/t_0)} = -K \frac{1}{(t+t_0)} \quad | \cdot e^{t/\tau}$$

$$V_{OUT}' e^{t/\tau} + \frac{1}{\tau} e^{t/\tau} V_{OUT} = -K e^{t/\tau} \frac{1}{(t+t_0)}$$

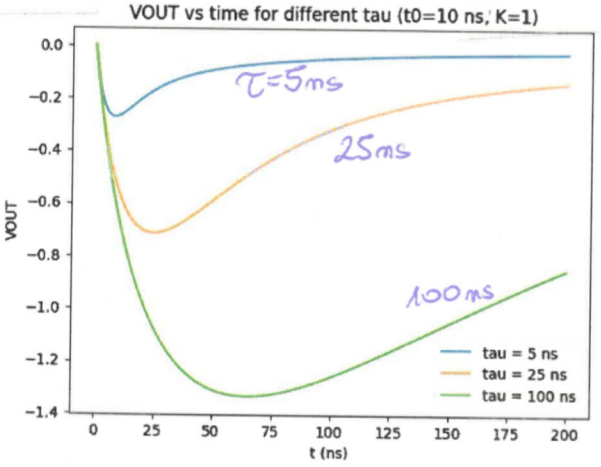
$$\frac{d}{dt}\left(V_{OUT} e^{t/\tau}\right) = -\frac{K e^{t/\tau}}{(t+t_0)} \quad | \cdot dt, \text{ INTEGRIRAMO}$$

$$V_{OUT} e^{t/\tau} - V_{OUT}(0) = -K \int_0^t \frac{e^{t/\tau}}{(t+t_0)} dt$$

ker $V_{OUT}(0) = 0 \Rightarrow V_{OUT}(t) = -e^{-t/\tau} K \int_0^t \frac{e^{t/\tau}}{(t+t_0)} dt$

z $\int \frac{e^{s/\tau}}{(s+t_0)} ds = e^{-t_0/\tau} E_i\left(\frac{s+t_0}{\tau}\right)$ EKSPONENT. INTEGRAL

$$V_{OUT}(t) = -K e^{-(t+t_0)/\tau} \left[E_i\left(\frac{t+t_0}{\tau}\right) - E_i\left(\frac{t_0}{\tau}\right)\right]$$



MAJNŠI τ: SIGNAL SE HITREJE ZAKLJUČI, VENDAR JE NIŽJI

V MINIMUMU $V_{OUT}' = 0 \Rightarrow \frac{1}{\tau} V_{OUT}^{MIN} = -K \frac{1}{t_{MIN} + t_0}$

IZ SLIKE $t_{MIN} \sim \tau$, $t_{MIN} = \alpha\tau$, $\alpha \sim 1$. $V_{OUT}^{MIN} = -K \frac{\tau}{\alpha\tau + t_0}$

$\Rightarrow$ ZA $t_0 \gg \tau$: $V_{OUT}^{MIN} = -K \frac{\tau}{t_0}$; $t_0 \ll \tau$: V_{OUT}^{MIN} NEODVISEN OD τ.