MIS 6.3. 2026

IONIZACIJSKI DETEKTORJI

RAZVOJ SIGNALA V CILINDRIČNEM PROPORCIONALNEM STEVCU

$$E = \frac{V_0}{\ln\frac{b}{a}}\frac{1}{r} \qquad C = \frac{2\pi\varepsilon_0 l}{\ln\frac{b}{a}} \qquad \varphi = -\frac{V_0}{\ln\frac{b}{a}}\cdot\ln\frac{r}{a} =$$

POTENC. ENER. NABOJA q NA r $\quad W_p = e\varphi(r)$

$$dW_p = q\frac{d\varphi}{dr}dr$$

ENERGIJA KONDENZATORJA: $W_e = \frac{1}{2}CV_0^2$; $dW_e = CV_0\,du$

ČE SPREMEMBA HITRA (NI ČASA ZA IZMENJAVO Z IZVOROM NAPETOSTI)

$$dW_p = dW_e \Rightarrow q\frac{d\varphi}{dr}dr = CV_0\,du \qquad \text{SPLOŠNO}$$

$$du = \frac{q}{CV_0}\frac{d\varphi}{dr}dr = -\frac{q}{CV_0}\cdot\frac{V_0}{\ln\frac{b}{a}}\cdot\frac{1}{r}\cdot dr =$$

$$= -\frac{1}{2\pi\varepsilon_0 l}q\frac{1}{r}dr$$

ZA IONE
$r: r_0 \to r(t)$ $\quad u(t) = -\frac{1}{2\pi\varepsilon_0 l}\cdot q\ln\frac{r(t)}{r_0}$

KER IONI NASTANEJO ZELO BLIZU ANODE $\to r_0 \sim a$

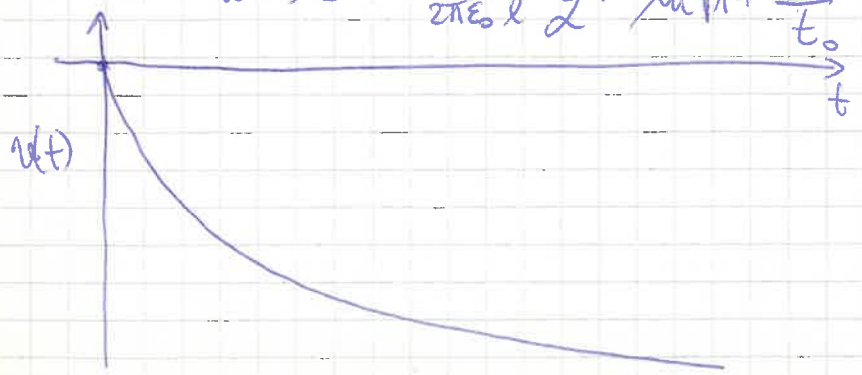
$$u(t) = -\frac{1}{2\pi\varepsilon_0 l}\cdot q\ln\frac{r(t)}{a}$$

$r(t)$; $\quad v_D^+ = \frac{dr}{dt} = \mu^+ E = \mu^+\frac{V_0}{\ln\frac{b}{a}}\frac{1}{r}$

$$\Rightarrow \quad r\,dr = \mu^+\frac{V_0}{\ln\frac{b}{a}}dt$$

$$\frac{1}{2}\left(r^2(t) - a^2\right) = \mu^+\frac{V_0}{\ln\frac{b}{a}}t$$

$$r(t) = a\sqrt{1 + \frac{2\mu^+ V_0}{a^2\ln\frac{b}{a}}\cdot t} = a\sqrt{1 + \frac{t}{t_0}}$$

$$t_0 = \frac{a^2\ln\frac{b}{a}}{2\mu^+ V_0}$$

$$u(t) = -\frac{1}{2\pi\varepsilon_0 l}\cdot q\cdot\ln\sqrt{1 + \frac{t}{t_0}} \qquad b = r(T) \Rightarrow T = t_0\left(\frac{b^2}{a^2} - 1\right)$$