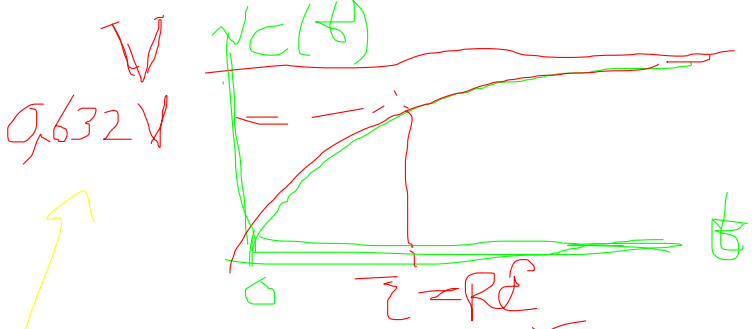


$e^{-1} = 0,368$

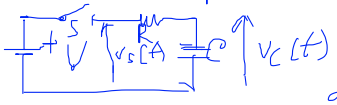
$1 - e^{-1} = 0,632$

konstanta waktu

$\tau (tau) = RC$

*Analisis Transien

Contoh : ✂ Pemuatan kapasitor

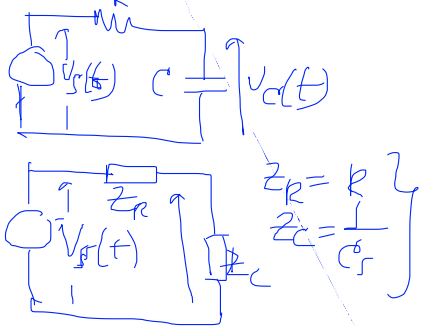


pada t = 0 saklar S ditutup, tentukan :

a) Model Nisbah Alih Rangkaian RC

b) $v_c(t)$, $t \geq 0$

Konsep Impedansi



$Z_R = R$

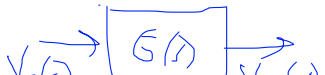
$Z_C = \frac{1}{Cs}$

$$V_c(s) = \frac{Z_C}{Z_R + Z_C} V_s(s)$$

$$= \frac{\frac{1}{Cs}}{R + \frac{1}{Cs}} V_s(s)$$

$$= \frac{1}{RCs + 1} V_s(s)$$

a) Model Nisbah Alih :



$$G(s) = \frac{V_c(s)}{V_s(s)} = \frac{1}{RCs + 1}$$

R [ohm] C [Farad]

t → [sec]

$\alpha = \frac{1}{RC}$

b) $v_s(t) = V u(t)$

$V_s(s) = V \left[u(t) \right] = \frac{V}{s}$

u(t) = V farad undak satuan

$u(t) \begin{cases} = 0, & t < 0 \\ = 1, & t \geq 0 \end{cases}$ (unit step)

$$V_c(s) = \frac{V}{s(RCs + 1)}$$

$$= \frac{V}{RC} \left[\frac{1}{s\left(s + \frac{1}{RC}\right)} \right]$$

$$v_c(t) = \mathcal{L}^{-1} V_c(s)$$

$$= \frac{V}{RC} \mathcal{L}^{-1} \frac{1}{s\left(s + \frac{1}{RC}\right)}$$

$$= \frac{V}{RC} \left[RC\left(1 - e^{-t/RC}\right) \right]$$

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$$\boxed{v_c(t) = V\left(1 - e^{-t/RC}\right)}$$