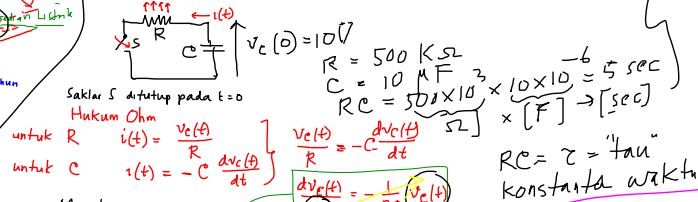


Project 1-2014

Verifikasi SIMULINK

Rangkaian RC Seri



$$\int \frac{dx}{x} = \int \left(\frac{1}{x} \right) dx = \ln(x)$$

$$\ln(x) = y$$

$$x = e^y$$

$RC = \tau = \text{"tau"}$
konstanta waktu

Analisis 1

$$\int \frac{dv_c(t)}{v_c(t)} = -\frac{1}{RC} \int dt = -\frac{t}{RC} + K$$

$$\ln[v_c(t)] = -\frac{t}{RC} + K$$

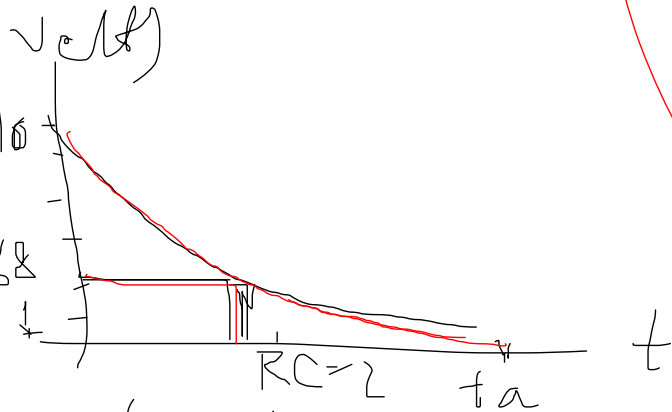
$$v_c(t) = e^{-\frac{t}{RC} + K} = (e^{-\frac{t}{RC}}) e^K$$

$$= A e^{-t/RC}$$

$$v_c(0) = A e^0 = A = 10$$

Analitik (EXACT) → $v_c(t) = 10 e^{-t/RC}$

$RC = 5 \cdot t = 5$
 $v_c(5) = 10 e^{-1} = \frac{10}{e}$



t_a ditentukan sampai

$v_c(t_a) \lll 1 \text{ Volt}$

Project 1 (dikumpul 26/03/14)

Selidiki perilaku "error" untuk beberapa nilai "Relative Tolerance" (10^{-6} , 10^{-5} , 3×10^{-5} , dll) dan simulasi Rangkaian RC, dengan

nilai $R = A_1 B_1 C_1 \text{ K}\Omega \rightarrow D41211 A_1 B_1 C_1 \checkmark$
 $C = A_2 B_2 C_2 \text{ }\mu\text{F} \rightarrow D41211 A_2 B_2 C_2 \checkmark$

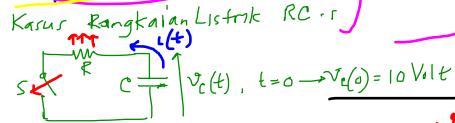
$$\int \frac{dx}{x} = \int x^{-1} dx = \int \left(\frac{1}{x}\right) dx = \ln(x)$$

$$\ln(x) = y$$

$$x = e^y$$

Project 1

Verifikasi SIMULINK

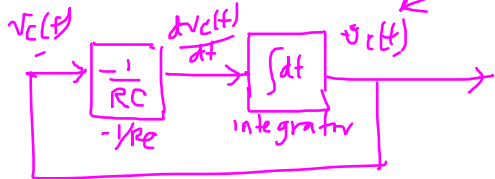


Hukum Ohm

* Untuk R $i(t) = \frac{V_c(t)}{R}$

* Untuk C $i(t) = -C \frac{dV_c(t)}{dt}$

Model SIMULINK



$R = 100 \text{ K}\Omega$ $C = 30 \mu\text{F}$

$RC = 100 \times 10^3 \times 30 \times 10^{-6} = 3 \text{ sec}$

$[\Omega * \text{F} = \text{sec}]$

$RC = \tau = \text{tau}$, Konstanta Waktu

$V_c(t)$ Analitik:

$$V_c(t) = 10 e^{-t/3}$$

Excel

$$\int dx = x$$

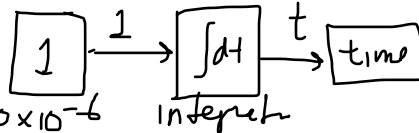
$$\int 1 dt = \int dt = t$$

$$\int x dx = \frac{1}{2} x^2 + C$$

$$\frac{V_c(t)}{R} = -C \frac{dV_c(t)}{dt}$$

$$\frac{dV_c(t)}{dt} = -\frac{1}{RC} V_c(t)$$

Pembangkit Waktu



$$\frac{dV_c(t)}{V_c(t)} = -\frac{1}{RC} dt = -\frac{t}{RC} + K$$

$$\ln[V_c(t)] = -\frac{t}{RC} + K$$

$$V_c(t) = e^{-\frac{t}{RC} + K}$$

$$= e^K \cdot e^{-\frac{t}{RC}}$$

$$= A e^{-t/RC}$$

$$t=0 \rightarrow V_c(0) = A e^0 = A = 10$$