

PROJEK 1- VERIFIKASI SIMULINIK RANGKAIAN RC

time
spreadsheet
SIMULINK
 $V_c(t)$

* Untuk SIMULINK, $\epsilon = 10^{-3}$: $\rightarrow \epsilon = 10^{-5}$
 $\epsilon = 10^{-5}$
 $\epsilon = 10^{-6}$

t(sec)	$V_c(t)$ ANALITIK	$V_c(t)$ SIMULINK	ERROR %
0	10	10	0
...	...	...	...
...	...	...	...

MATLAB

$$\text{ERROR} = \left| \frac{V_{c \text{ ana}} - V_{c \text{ sim}}}{V_{c \text{ ana}}} \right| \times 100\%$$

Solusi analitik

~~EXACT~~

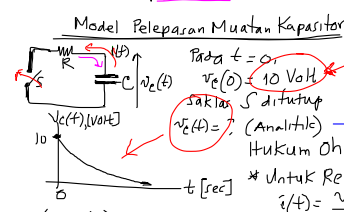
$$V_c(t) = 10e^{-\frac{t}{RC}}$$

Referensi

EXCEPT

R diambil dari No. 5th 1025T ohm
 C, D42110ABC RR = 10ABC ohm
 D42110DEF C = 0,00DEF Farad
 0,00DEF 0,00101

TUGAS 1
VERIFIKASI SIMULINK
pengaruh nilai "Relative Tolerance"
terhadap AKURASI Simulink



Hukum Ohm:
 $i(t) = \frac{V_c(t)}{R}$ (1)
 $i(t) = -C \frac{dV_c(t)}{dt}$ (2)
 $\rightarrow \frac{dV_c(t)}{dt} = -\frac{1}{RC} V_c(t)$ pers. differensial

Analisis (dengan KALKULUS)

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

$$\ln[V_c(t)] = -\frac{1}{RC} t + K$$

$$V_c(t) = e^{[-\frac{1}{RC} t + K]}$$

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

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

solusi umum

$t = 0 \rightarrow V_c(0) = 10 \text{ Volt}$
 $10 = A e^{-\frac{0}{RC}} = A$

$$\ln x = a$$

$$x = e^a$$

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

$$= \ln x$$