KUIS 4 EL2008 PEMECAHAN MASALAH DENGAN C

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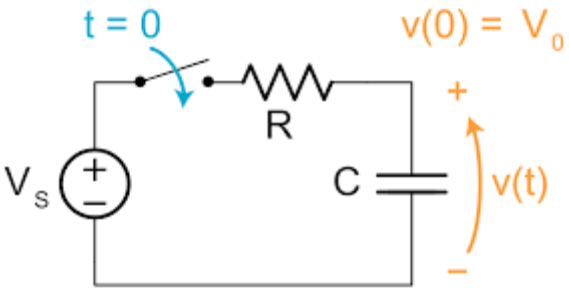
PENURUNAN RUMUS



Dengan analisis KCL:

$$C\frac{dV_C(t)}{dt}+\frac{V_C(t)-V_s}{R}=0$$

$$C\frac{\Delta V_C(t)}{\Delta t}+\frac{V_C(t)-V_s}{R}=0$$

$$\frac{\Delta V_C(t)}{\Delta t}+\frac{V_C(t)-V_s}{RC}=0$$

$$\frac{V_C(t)-V_C(t-\Delta t)}{\Delta t}+\frac{V_C(t)-V_s}{RC}=0$$

$$\frac{V_C(t)}{\Delta t}-\frac{V_C(t-\Delta t)}{\Delta t}+\frac{V_C(t)}{RC}-\frac{V_s}{RC}=0$$

$$\frac{V_C(t)}{\Delta t}+\frac{V_C(t)}{RC}=\frac{V_C(t-\Delta t)}{\Delta t}+\frac{V_s}{RC}$$

$$V_C(t)\left(\frac{1}{\Delta t}+\frac{1}{RC}\right)=\frac{V_C(t-\Delta t)}{\Delta t}+\frac{V_s}{RC}$$

$$V_C(t)=\frac{\frac{V_C(t-\Delta t)}{\Delta t}+\frac{V_s}{RC}}{\left(\frac{1}{\Delta t}+\frac{1}{RC}\right)}$$

Sehingga diperoleh:

$$V_C(t)=\frac{\frac{V_C(t-\Delta t)RC}{\Delta t}+V_s}{\left(\frac{RC}{\Delta t}+1\right)}$$

Keterangan:

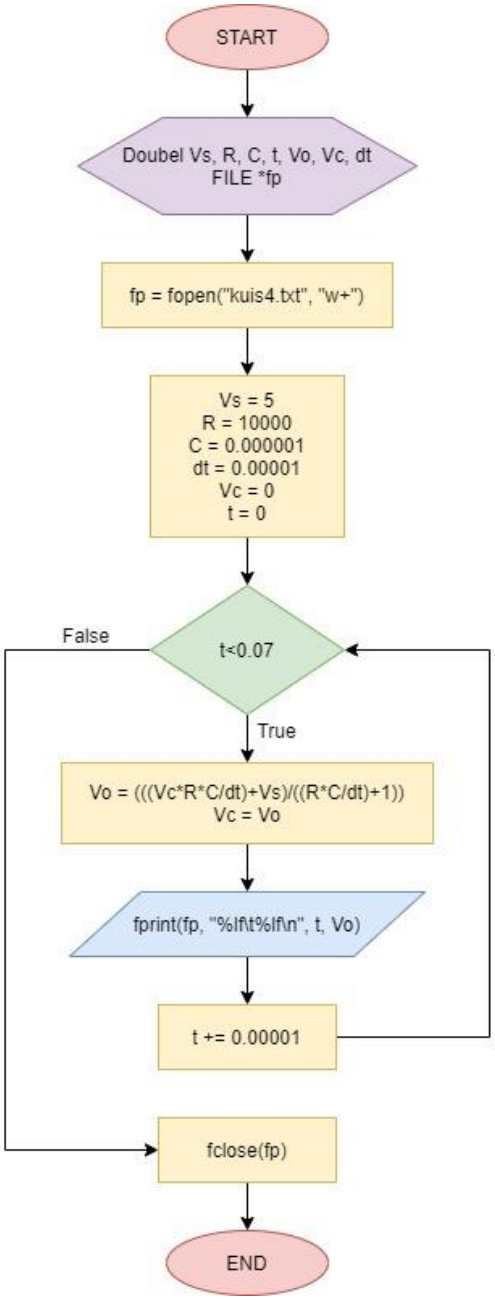
Vs = tegangan sumber

Vc = tegangan pada kapasitor

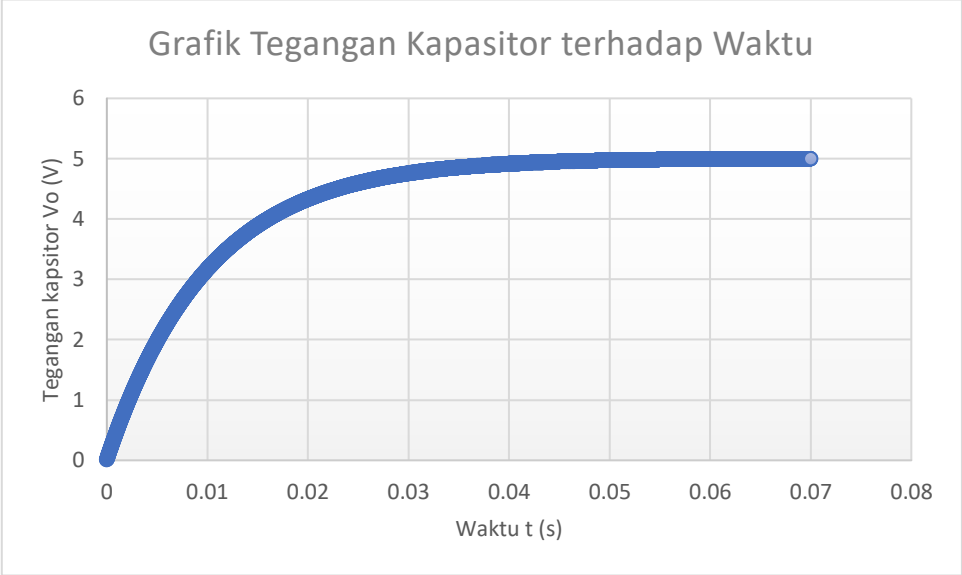
R = resistansi resistor

C = kapasitansi kapasitor

FLOWCHART



GRAFIK


Grafik Tegangan Kapasitor terhadap Waktu
Tegangan kapsitor Vo (V)
6
5
4
3
2
1
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Waktu t (s)