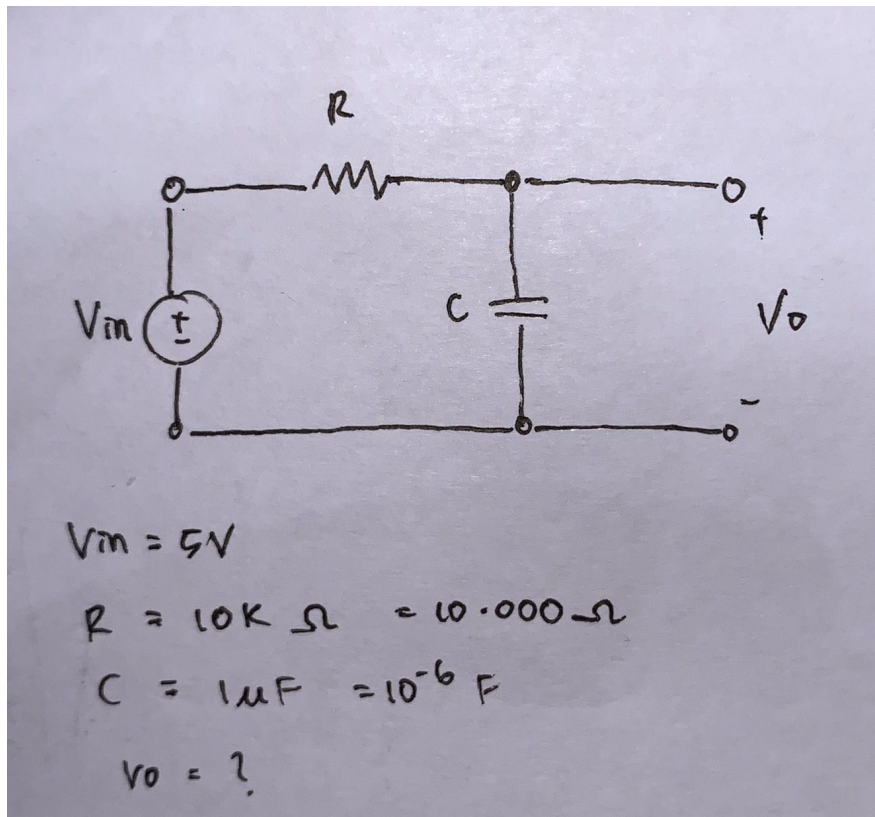Nama   : Ian Azarya Aryanto
NIM   : 13218055
Kelas   : K02

LAPORAN QUIZ 04 PMC
EL2008

1. SOAL Quiz 04

=> Mencari nilai dari Vo dari rangkaian berikut :

$V_m = 5V$

$R = 10K \Omega = 10.000 \Omega$

$C = 1\mu F = 10^{-6} F$

$v_0 = ?$

2. PENURUNAN RUMUS

Penurunan Rumus :

KVL

$$-Vin + IR + Vo = 0$$

$$Vo = -IR + Vin$$

$\Rightarrow$ I yang melewati kapasitor $C = \dfrac{C\,dVc\,(t)}{dt}$, $\dfrac{Cd\,Vo\,(t)}{dt}$ $\Rightarrow$ dalam parameter waktu

$\rightarrow$ $Vo = -IR + Vin$

$$Vo(t) = -C\dfrac{dVo(t)}{dt}R + Vin$$

$$Vo(t) = Vin - CR\dfrac{\Delta Vo\,(t)}{\Delta t} \quad \Rightarrow \quad \Delta Vo(t) = Vo(t) - Vo(t-\Delta t)$$

$$Vo(t) = Vin - CR\dfrac{(Vo(t) - Vo(t-\Delta t))}{\Delta t}$$

$$\Delta t\,Vo(t) = \Delta t \cdot Vin - CR\,Vo(t) + CR\,Vo(t-\Delta t)$$

$$Vo(t)(\Delta t + CR) = \Delta t\,Vin + CR\,Vo(t-\Delta t)$$

$$Vo(t) = \dfrac{Vin\,\Delta t + CR\,Vo(t-\Delta t)}{(\Delta t + CR)}$$

$\Rightarrow$ Dalam hal ini, Δt dibuat dapat diinput dalam program secara manual sesuai keinginan user. Semakin kecil Δt (pada program disebut dt), maka perhitungan akan semakin teliti.

$\Rightarrow$ Pada contoh eksekusi di bawah, digunakan partisi waktu sebesar 0,1 ms.

3. HASIL EKSEKUSI


```
C:\WINDOWS\SYSTEM32\cmd.exe
Masukkan partisi waktu (dt) : 0.0001

Nilai Vo dengan partisi waktu 0.000100 s
telah berhasil diwrite ke dalam file lowpass.csv...

------------------
(program exited with code: 0)

Press any key to continue . . .
```
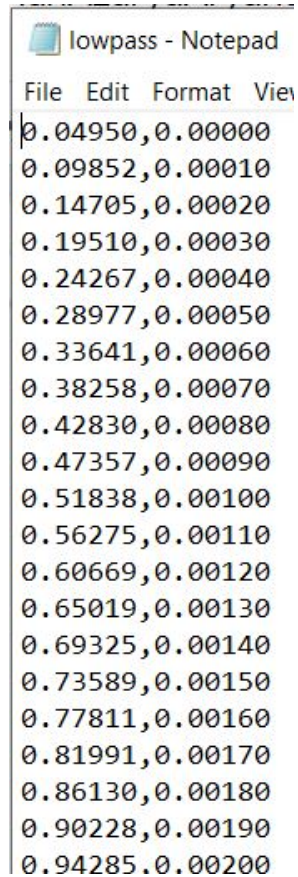
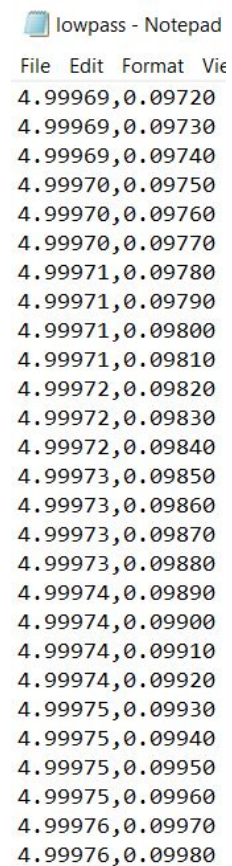Input dari nilai partisi waktu dt adalah 0.1 ms = 0.0001 s

4. FILE lowpass.csv

=> Berikut merupakan file lowpass.csv setelah program selesai (nilai Vo dan waktu sudah dimasukkan dalam file)

- Contoh 1 (Bagian awal file) :

lowpass - Notepad

File Edit Format View

```
0.04950,0.00000
0.09852,0.00010
0.14705,0.00020
0.19510,0.00030
0.24267,0.00040
0.28977,0.00050
0.33641,0.00060
0.38258,0.00070
0.42830,0.00080
0.47357,0.00090
0.51838,0.00100
0.56275,0.00110
0.60669,0.00120
0.65019,0.00130
0.69325,0.00140
0.73589,0.00150
0.77811,0.00160
0.81991,0.00170
0.86130,0.00180
0.90228,0.00190
0.94285,0.00200
```

- Contoh 2 (Bagian akhir file) :

lowpass - Notepad

File Edit Format Vie

```
4.99969,0.09720
4.99969,0.09730
4.99969,0.09740
4.99970,0.09750
4.99970,0.09760
4.99970,0.09770
4.99971,0.09780
4.99971,0.09790
4.99971,0.09800
4.99971,0.09810
4.99972,0.09820
4.99972,0.09830
4.99972,0.09840
4.99973,0.09850
4.99973,0.09860
4.99973,0.09870
4.99973,0.09880
4.99974,0.09890
4.99974,0.09900
4.99974,0.09910
4.99974,0.09920
4.99975,0.09930
4.99975,0.09940
4.99975,0.09950
4.99975,0.09960
4.99976,0.09970
4.99976,0.09980
```

5. FLOWCHART

Flowchart
Program Utama

START

double Vs = 5,
double R = 10000,
double C = 0.000001,
double T = R*C,
double t =0,
double dt,
double Vo = 0,
int i = 0,
int j = 0,
double array[1000],
FILE *myfile

Input :
dt

(Vo < Vs) && (i<1000)

No

Yes

array[i] = Vo,
Vo = (Vs+(Vo*T/dt))/(1+(T/dt)),
i += 1

myfile = fopen ("lowpass.csv","w")

j = 0

j < 1000

Yes

No

(array[j]>0)&&(j<=i)

Yes

Memasukkan
array[j],t
ke dalam file
"lowpas.csv"

t = t + dt
j++

fclose(myfile)

FINISH