```
close all
clc

Freq = 30000;
Vpp = 17.4;
Po = 21.228;
R1 = 1;
R2 = 10;
R3 = 100;

Iout1 = sqrt(Po/R1)
```

```
Iout1 = 4.6074
```

```
Vout1 = Iout1*R1
```

```
Vout1 = 4.6074
```

```
Pa = Iout1*Vout1
```

```
Pa = 21.2280
```

```

Iout2 = sqrt(Po/R2)
```

```
Iout2 = 1.4570
```

```
Vout2 = Iout2*R2
```

```
Vout2 = 14.5698
```

```
Pb = Iout2*Vout2
```

```
Pb = 21.2280
```

```

Iout3 = sqrt(Po/R3)
```

```
Iout3 = 0.4607
```

```
Vout3 = Iout3*R3
```

```
Vout3 = 46.0739
```

```
Pc = Iout3*Vout3
```

```
Pc = 21.2280
```

```

DL1 = 0.2*Iout1*(Vout1/Vpp)
```

```
DL1 = 0.2440
```

```
DL2 = 0.2*Iout2*(Vout2/Vpp)
```

```
DL2 = 0.2440
```

```
DL3 = 0.2*Iout3*(Vout3/Vpp)
```

```
DL3 = 0.2440
```

```
L1 = abs((Vpp*(Vout1-Vpp))/(Freq*DL1*Vout1))
```

```
L1 = 0.0066
```

```
L2 = abs((Vpp*(Vout2-Vpp))/(Freq*DL2*Vout2))
```

```
L2 = 4.6174e-04
```

```
L3 = abs((Vpp*(Vout3-Vpp))/(Freq*DL3*Vout3))
```

```
L3 = 0.0015
```

```
D1 = Vout1/(Vout1+Vpp)
```

```
D1 = 0.2094
```

```
D2 = Vout2/(Vout2+Vpp)
```

```
D2 = 0.4557
```

```
D3 = Vout3/(Vout3+Vpp)
```

```
D3 = 0.7259
```

```
C1 = (Iout1*D1)/(30000*0.05*Vout1)
```

```
C1 = 1.3957e-04
```

```
C2 = (Iout2*D2)/(30000*0.05*Vout2)
```

```
C2 = 3.0382e-05
```

```
C3 = (Iout3*D3)/(30000*0.05*Vout3)
```

```
C3 = 4.8391e-06
```

```
%current sensor
VoMax = 5 %voltage going into the MCU
```

```
VoMax = 5
```

```
VoMin = VoMax/(2^10) %min voltage going into the MCU
```

```
VoMin = 0.0049
```

```
Iimin = 0 %min current
```

```
Iimin = 0
```

```
ViMax = 50*10^-3 %at least 10x bigger than Vos
```

```
ViMax = 0.0500
```

```
IiMax = 0.61*2   % maximum current measured
```

```
IiMax = 1.2200
```

```
Rshunt = ViMax/IiMax %shunt resistor
```

```
Rshunt = 0.0410
```

```
G = (VoMax - VoMin)/((IiMax - Iimin)*Rshunt) %gain calculations
```

```
G = 99.9023
```

```
RpositiveIn = 1000 %positive terminal resistor
```

```
RpositiveIn = 1000
```

```
RpositiveFed = RpositiveIn*G  %positive feedback
```

```
RpositiveFed = 9.9902e+04
```

```
%G = R3/R2


RnegativeIn = RpositiveIn
```

```
RnegativeIn = 1000
```

```
RnegativeFed = RpositiveFed
```

```
RnegativeFed = 9.9902e+04
```

```
%voltage sensor
%G = R2/R1 = 1/5
%VoMax voltage going into the MCU
%VoMin min voltage going into the MCU
%Gain = Vo/Vi
GVoltage = 5/17.4
```

```
GVoltage = 0.2874
```

```
RVoltageIn = 10000 %ohms
```

```
RVoltageIn = 10000
```

```
RVoltageFed = GVoltage*RVoltageIn
```

```
RVoltageFed = 2.8736e+03
```