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Prelab 2

```
% Name: Logan Calder
% Lab Number: 2
% Class: ECEN 50L
% Date: 4/16/24
% Section time: 14:15T
```

Part 1 - Solving For Resistors in Series

```
Vs = 10;

R1 = 987;
R2 = 1990;
R3 = 2971;
R4 = 4637;
R5 = 7372;
R6 = 9043;

Rt = (R5+R6);
Rt = (Rt * R4)/(Rt+R4);
Rt = Rt + R3;
Rt = (Rt * R2)/(Rt+R2);
Rt = R1 + Rt

% V = IR so I = V/R

Rt = R1+R2; % They are in series so add

I1 = Vs/(R1+R2)
V1 = I1*R1
V2 = I1*R2

Rt =

    2.5153e+03

I1 =

    0.0034
```

$V1 =$

3.3154

$V2 =$

6.6846

Part 2 - Solving For Complex Circuit

```
syms I1 I2 V1 V2 V3 I3;
```

```
R23 = (R2+R3)/(R2*R3);
```

```
eq1 = I1 == V1/R1;
```

```
eq2 = I1 - I2 - I3 == 0;
```

```
eq3 = Vs-V1-V2 == 0;
```

```
eq4 = V3 == V2;
```

```
eq5 = I2 == V2/R2;
```

```
eq6 = I3 == V3/R3;
```

```
eqns = [eq1, eq2, eq3, eq4, eq5, eq6];
```

```
vars = [I1,I2,I3,V1,V2,V3];
```

```
[C, S] = equationsToMatrix(eqns, vars);
```

```
V = inv(C) * S
```

$V =$

```
49610/10808797  
29710/10808797  
19900/10808797  
48965070/10808797  
59122900/10808797  
59122900/10808797
```

Part 3 - Kirchhoff Laws

```
syms I1 I2 I3 I4 I5 V1 V2 V3 V4 V5 V6;
```

```
R56 = R5 + R6;
```

```
R456 = (R4+R56)/(R4*R56);
```

```
eq1 = Vs - V1 - V2 == 0;
```

```
eq2 = I1 == V1/R1;
```

```

eq3 = I2 == V2/R2;
eq4 = I3 == V3/R3;
eq5 = I4 == V4/R4;
eq6 = I5 == V5/R5;
eq7 = I5 == V6/R6;
eq8 = V5+V6-V4 == 0;
eq9 = V3 + V4 - V2 == 0;
eq10 = I3 + I2 - I1 == 0;
eq11 = I5 + I4 - I3 == 0;

eqns = [eq1, eq2, eq3, eq4, eq5, eq6, eq7, eq8, eq9, eq10, eq11];

vars = [I1,I2,I3,I4,I5,V1,V2,V3,V4,V5,V6];

[C, S] = equationsToMatrix(eqns, vars);
V = inv(C) * S;
double(V)

% Assign values from V back to the variables
I1 = V(1);
I2 = V(2);
I3 = V(3);
I4 = V(4);
I5 = V(5);
V1 = V(6);
V2 = V(7);
V3 = V(8);
V4 = V(9);
V5 = V(10);
V6 = V(11);

% Verify KCL:

I2+I3-I1 % a
I5+I4-I3 % b

% Verify KVL:

Vs-V1-V2
V3+V4-V2
V5+V6-V4

ans =

    0.0040
    0.0031
    0.0009
    0.0007
    0.0002
    3.9240
    6.0760
    2.7407

```

3.3353
1.4979
1.8374

ans =

0

ans =

0

ans =

0

ans =

0

ans =

0

Part 4 - Nominal Value of Resistors

% Brown Black Red >>> 1000 Ohm
% Red Purple Red >>> 2700 Ohm

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