3.30 Apply loop analysis to the circuit of Figure P3.30 to find the power dissipated by the 4-Ω resistance. Check your result.

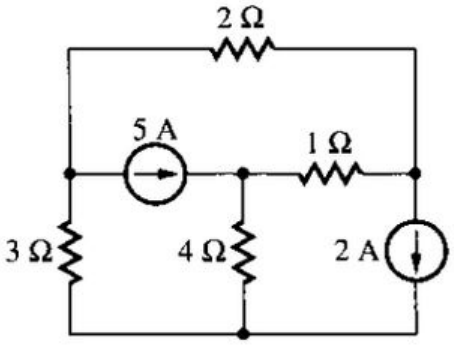
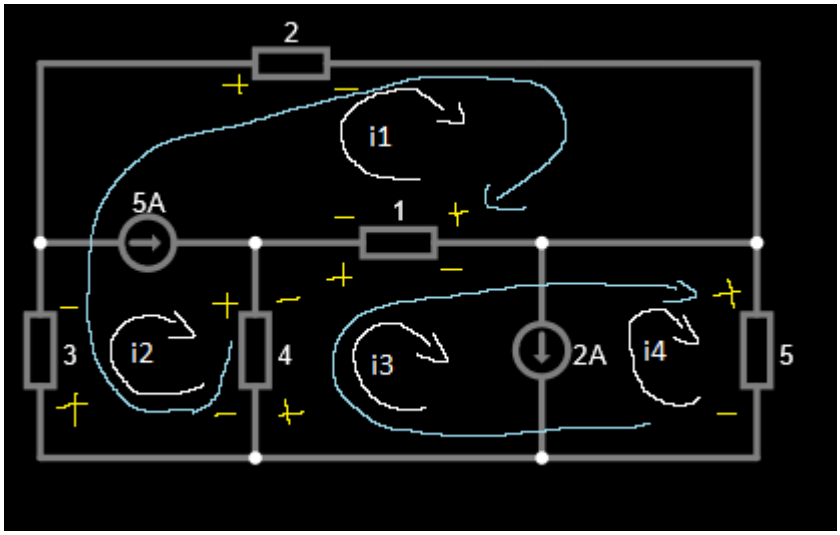


Figure P3.30

3.31 Repeat Problem 3.30, but with an additional 5-Ω resistance in parallel with the 2-A source.

De acuerdo con el enunciado redibujamos el circuito, identificando mallas y super mallas



Ahora definimos la ecuacion de restriccion de cada super malla junto con sus ecuaciones:

```
syms i1 i2 i3 i4

If1 = 5; %[A]
If2 = 2; %[A]

ec_restric1 = i2-i1 == If1
```

ec_restric1 = $i_2 - i_1 = 5$

```
ec_restric2 = i3 - i4 == If2
```

ec_restric2 = $i_3 - i_4 = 2$

```
sm1 = simplify((4*(i2-i3))+(3*i2)+(2*i1)+(1*(i1-i3))==0)
```

sm1 = $3\,i_1 + 7\,i_2 = 5\,i_3$

```
sm2 = simplify((4*(i3-i2))+(1*(i3-i1))+(5*i4)==0)
```

sm2 = $i_1 + 4\,i_2 = 5\,i_3 + 5\,i_4$

```
m = [3 7 -5 0;1 4 -5 -5;-1 1 0 0;0 0 1 -1];
n = [0;0;5;2];
h = m\n;

i1 = h(1,1)%[A]
```

```
i1 = -2.6667
```

```
i2 = h(2,1)%[A]
```

```
i2 = 2.3333
```

```
i3 = h(3,1)%[A]
```

```
i3 = 1.6667
```

```
i4 = h(4,1) %[A]
```

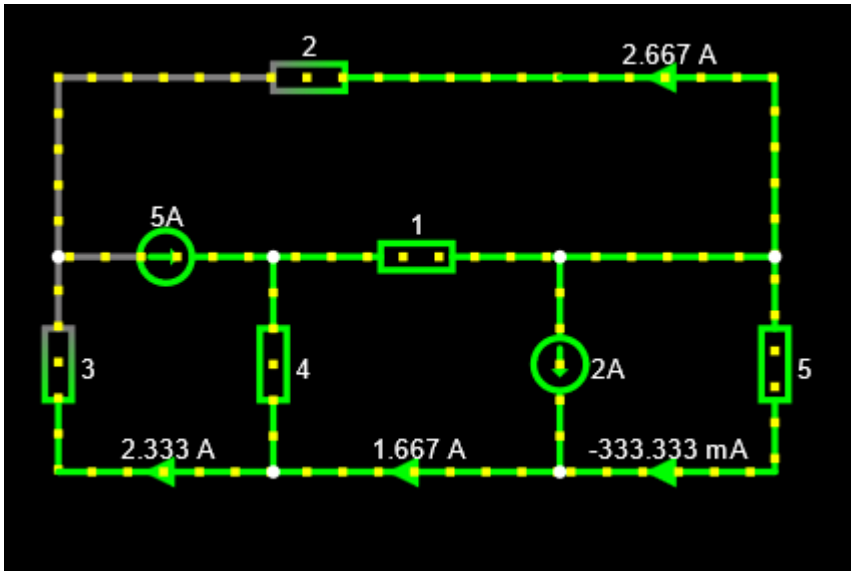
```
i4 = -0.3333
```

ya que tenemos las correintes el porblema nos pide calcular la potencia disipada en el resistor de 4 ohms

```
p_4ohm = ((i2-i3)^2)*4 %[W]
```

```
p_4ohm = 1.7778
```

Finalmente lo verificamos en el simulador


2
2.667 A
5A
1
3
4
2A
5
2.333 A
1.667 A
-333.333 mA