

```
1 %Xi Kun Zou M2
2 Vt = [10; 10i];
3 w=10;
4 R = [2; 1];
5 L = [0.1; 0.5];
6 ZL = w*L*i;
7 ZM = w*0.2i;
8 a = [(ZL(1)+R(1)) ZM; ZM (R(2)+ZL(2))];
9 %part a
10 I=a\Vt
11 %part b
12 V_R = I.*R
13 VL = I.*ZL;
14 VZM = I.*ZM;
15 V_ZL=[VL(1)+VZM(2);VL(2)+VZM(1)]
16 Kvl_Check = Vt-V_R-V_ZL
17 %part c
18 P_R = V_R.*conj(I) %absorbed
19 P_ZL = V_ZL.*conj(I) %absorbed
20 P_Vt = Vt.*conj(I) %delivered
21 Power_balance = P_Vt-P_R-P_ZL
22 %part d
23 disp('The average current through both inductors are 0 since they are sinuoids ')
24 disp('in the time domain. So the power they absorb has a average value of 0.')
25 disp('Therefore, the power is either stored in the resistors, or it's transfered')
26 disp('to the other circuit by a field. For the left resistor, it absorbed 55.7W,')
27 disp('but the source on the left only delivers about 47.5W, so some power must')
28 disp('come from the right circuit. The right source delivers 9W,but R2 only')
29 disp('absorbed 0.8W, proving that Right circuit is supplying positive power to ◀
left.')
```

```
30 PowerSupAverage = real(P_Vt(2)) - real(P_R(2)) % in W
31
```

Trial>> m2

I =

4.7541 - 2.2951i  
-0.0820 + 0.9016i

V\_R =

9.5082 - 4.5902i  
-0.0820 + 0.9016i

V\_ZL =

0.4918 + 4.5902i  
0.0820 + 9.0984i

Kvl\_Check =

1.0e-14 \*  
  
0.0888 + 0.0000i  
-0.0694 + 0.1776i

P\_R =

55.7377  
0.8197

P\_ZL =

-8.1967 +22.9508i  
8.1967 - 0.8197i

P\_Vt =

47.5410 +22.9508i  
9.0164 - 0.8197i

```
Power_balance =
```

```
1.0e-14 *
```

```
0.7105 + 0.3553i
```

```
0.0000 + 0.0444i
```

The average current through both inductors are 0 since they are sinuoids in the time domain. So the power they absorb has a average value of 0. Therefore, the power is either stored in the resistors, or its transfered to the other circuit by a field. For the left resistor, it absorbed 55.7W, but the source on the left only delivers about 47.5W, so some power must come from the right circuit. The right source delivers 9W, but R2 only absorbed 0.8W, proving that Right circuit is supplying positive power to left.

```
PowerSupAverage =
```

```
8.1967
```

```
Trial>>
```