Experiment Results P10

TEST 1:

Construct Simulink circuit according to the instruction of lab sheet, with all parameter values set to default.

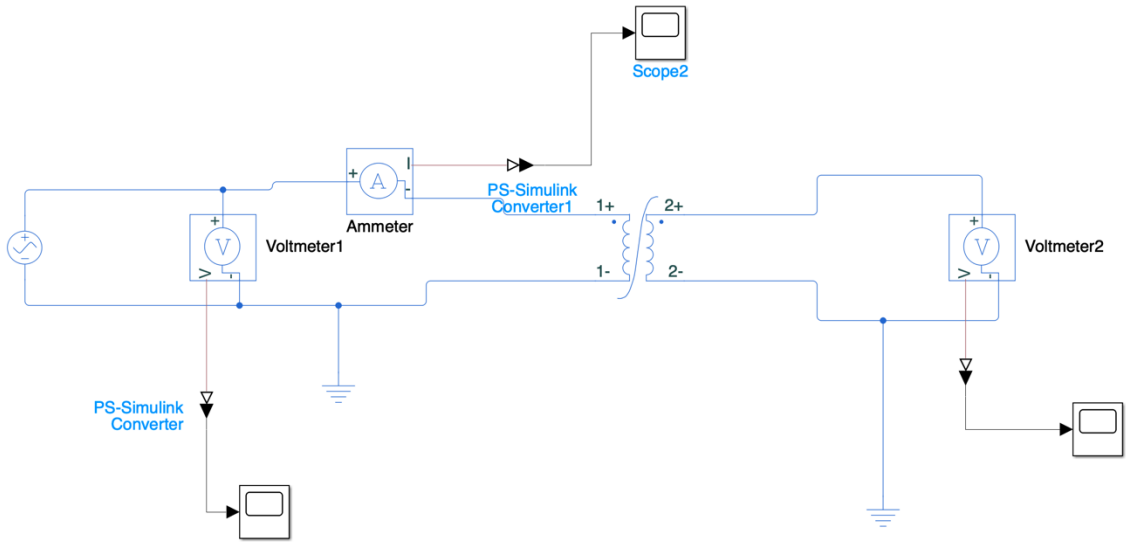

Figure 1

Then
Set the AC voltage source frequency to 50Hz and set 8 different values within 0V to 220V interval. Stop time set to 0.1.

Set AC source voltage to 27 V
V1 peak = 27 V.
I1 peak = 15.7 A.
V2 peak = 53 V.

Set AC source voltage to 54 V

V1 peak = 54 V.
I1 peak = 32.6 A.
V2 peak = 106.6V.

Set AC source voltage to 81 V

V1 peak = 80.8 V.
I1 peak = 49.5 A.
V2 peak = 159.5 V.

Set AC source voltage to 108 V

V1 peak = 108 V.
I1 peak = 66.4 A.
V2 peak = 213.1V.

Set AC source Voltage to 135 V

V1 peak = 135 V.
I1 peak = 83.25 A.
V2 peak = 266.2 V.

Set AC source Voltage to 162 V

V1 peak = 161.9 V.
I1 peak = 100.15 A.
V2 peak = 319.5 V.

Set AC source Voltage to 189 V

V1 peak = 188.9 V.
I1 peak = 117 A.
V2 peak = 372.5 V.

Set AC source Voltage to 216 V

V1 peak = 215.9 V.
I1 peak = 133.9 A.
V2 peak = 426 V.

Table 1

	V1 (V)	I1(A)	V2(V)
AC source voltage(V)	-	-	-
27	27	15.7	53
54	54	32.6	106.6
81	80.8	49.5	159.5
108	108	66.4	213.1
135	135	83.25	266.2
162	161.9	100.15	319.5
189	188.9	117	372.5
216	215.9	133.9	426

Turns ratio for different set of voltage values:

Table 2

k1	27/53
k2	270/533
k3	808/1595
k4	1080/2131
k5	675/1331
k6	1619/3195
k7	1889/3725
k8	2159/4260

TEST 2

Change voltmeter at secondary side to an ammeter. Set simulation time 0.1, and AC voltage source frequency 50 Hz, construct the circuit.

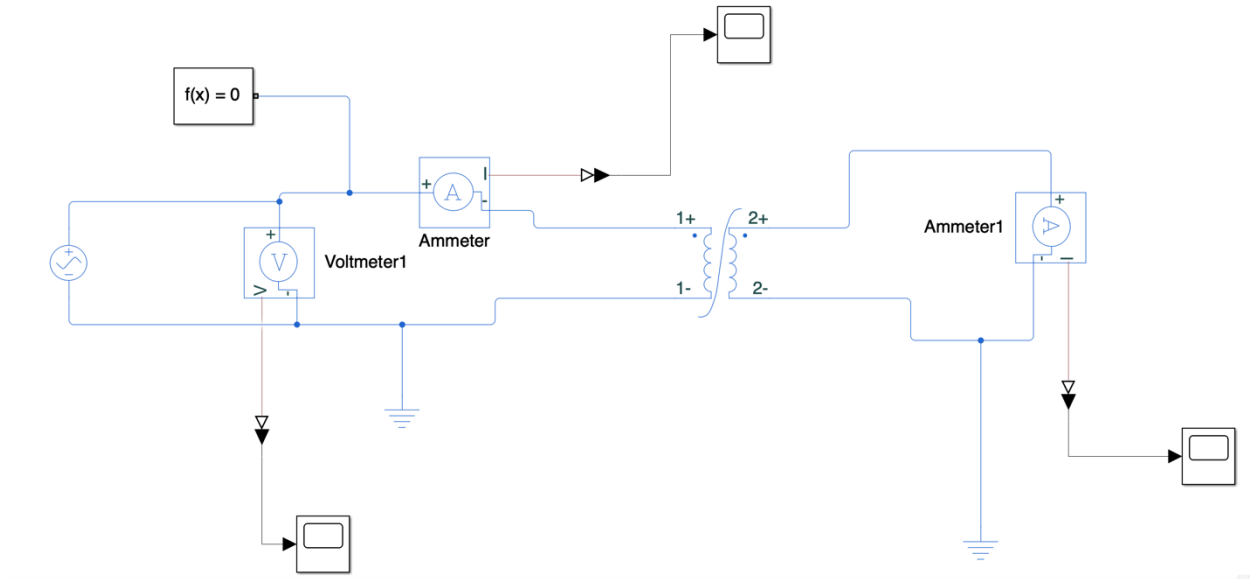

Figure 2

Set AC source Voltage to 0.5 V

V1 peak = 0.499 V.
I1 peak = 15.9 A.
I2 peak = 7.95 A.

Set AC source Voltage to 1.0 V

V1 peak = 1.0 V.
I1 peak = 37.15 A.
I2 peak = 15.8 A.

Set AC source Voltage to 1.5 V

V1 peak = 1.5 V.
I1 peak = 47.8 A.
I2 peak = 23.9 A.

Set AC source Voltage to 2.0 V

V1 peak = 2.0 V.
I1 peak = 63.7 A.
I2 peak = 31.85 A.

Set AC source Voltage to 2.5 V

V1 peak = 2.5 V.
I1 peak = 79.5 A.
I2 peak = 39.7 A.

Set AC source Voltage to 3.0 V

V1 peak = 2.999 V.
I1 peak = 95.6 A.
I2 peak = 47.8 A.

Set AC source Voltage to 3.5 V

V1 peak = 3.498 V.
I1 peak = 111.5 A.
I2 peak = 55.7 A

Set AC source Voltage to 4.0 V

V1 peak = 4.0 V.
I1 peak = 127.35 A.
I2 peak = 63.65 A.
.

Table 3

	V1 (V)	I1(A)	I2(A)
AC source voltage(V)	-	-	-
0.5	0.499	15.9	7.95
1.0	1.0	37.15	15.8
1.5	1.5	47.8	23.9
2.0	2.0	63.7	31.85
2.5	2.5	79.5	39.7
3.0	2.999	95.6	47.8
3.5	3.498	111.5	55.7
4.0	4.0	127.35	63.65

Turns ratio

Table 4

k1	1/2
k2	316/743
k3	1/2
k4	1/2
k5	397/795
k6	1/2
k7	557/1115
k8	1273/2547

TEST 3

PART 1
Add voltmeter and a 1 Ohm resistor to secondary side.

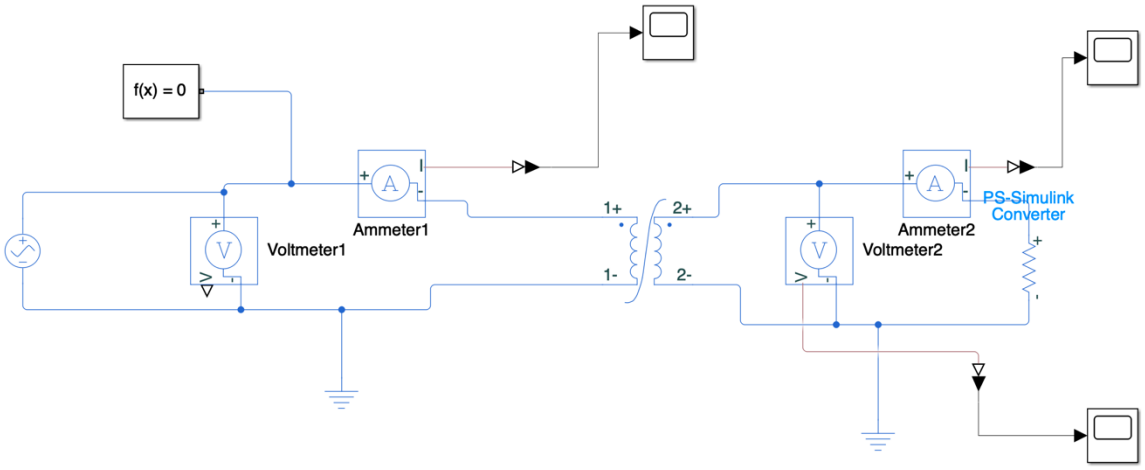

Figure 3

When V1 = 220 V and resistor is 0.1 Ohm, I2 = 414.8 A; I1 = 900 A; V2 = 415 V.

R = 100 Ohm

I2 = 4.335 A;
I1 = 137.15 A;
V2 = 433.5 V;

R = 200 Ohm

I2 = 2.17 A;
I1 = 136.65 A;
V2 = 434.2 V;

R = 300 Ohm

I2 = 1.445 A;
I1 = 136.5 A;
V2 = 433.3 V;

R = 400 Ohm

I2 = 1.085 A;
I1 = 136.5 A;
V2 = 433.7 V;

R = 500 Ohm

I2 = 0.87 A;
I1 = 136.5 A;
V2 = 434 V;

R = 600 Ohm

I2 = 0.7234 A;
I1 = 136.5 A;
V2 = 434 V;

R = 700 Ohm

I2 = 0.62 A;
I1 = 136.45 A;
V2 = 434.16 V;

PART 2

Change the resistor to capacitor and set the value of capacitor is 0.001 F. Set the simulation time to 0.3s.

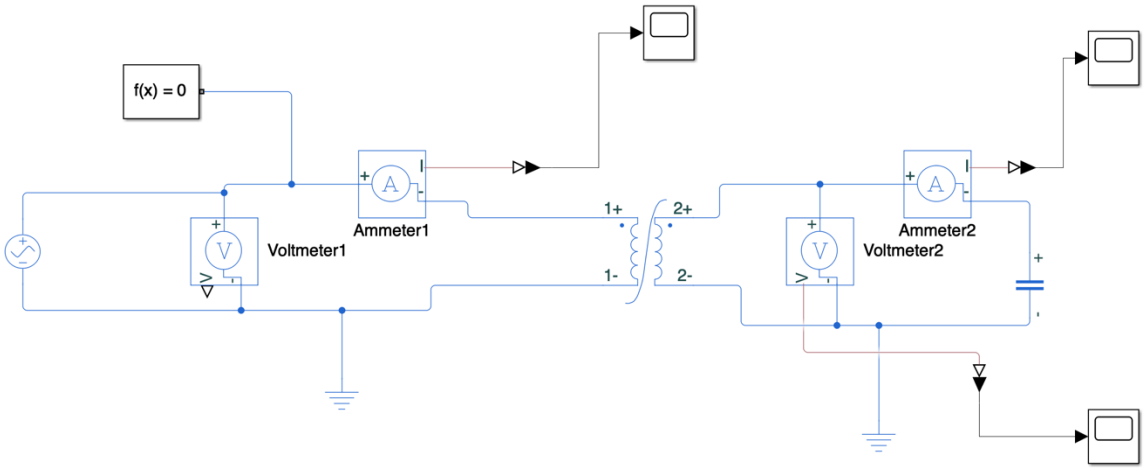

Figure 4

I2 = 143.3 A; I1 = 276 A; V2 = 451.5 V

C = 0.002 F

I2 = 297.05 A;
I1 = 582.05 A;
V2 = 472.4 V;

C = 0.003 F

I2 = 471.4 A;
I1 = 929.5 A;
V2 = 489.92 V;

C = 0.004 F

I2 = 649.5 A;
I1 = 1274 A;
V2 = 515.3 V;

C = 0.005 F

I2 = 850 A;
I1 = 1671.5 A;
V2 = 539.5 V;

C = 0.006 F

I2 = 1069.7 A;
I1 = 2107.8 A;
V2 = 566.4 V;

C = 0.007 F

I2 = 1312 A;
I1 = 2587.8 A;
V2 = 595.2 V;

C = 0.008 F

I2 = 1583.1 A;
I1 = 3121.3 A;
V2 = 627.37 V;