EXPERIMENT III CIRCUIT ANALYSIS TECHNIQUES, PRACTICAL SUPPLIES AND MAXIMUM POWER TRANSFER

Fall - 2023/2024

EEE 281 – Electrical Circuits
Lab 3 Report

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Objective:

In this experiment we learned Thevenin and Norton Subcircuits, how do we implement these subcircuits.

We understand the maximum power transfer concept.

We calculated the power through a specific load resistor.

We compared the measured and calculated values.

Results:

1a)

Calculated Vm in Prework 1.A (V)	Calculated Im in Prework 1.A (mA)	Simulated Vm in Prework 1.F (V)	Simulated Im in Prework 1.F (mA)	Measured Vm (V)	Measured Im (mA)
14.603	1.285	14.582	1.29	15.8	1.6

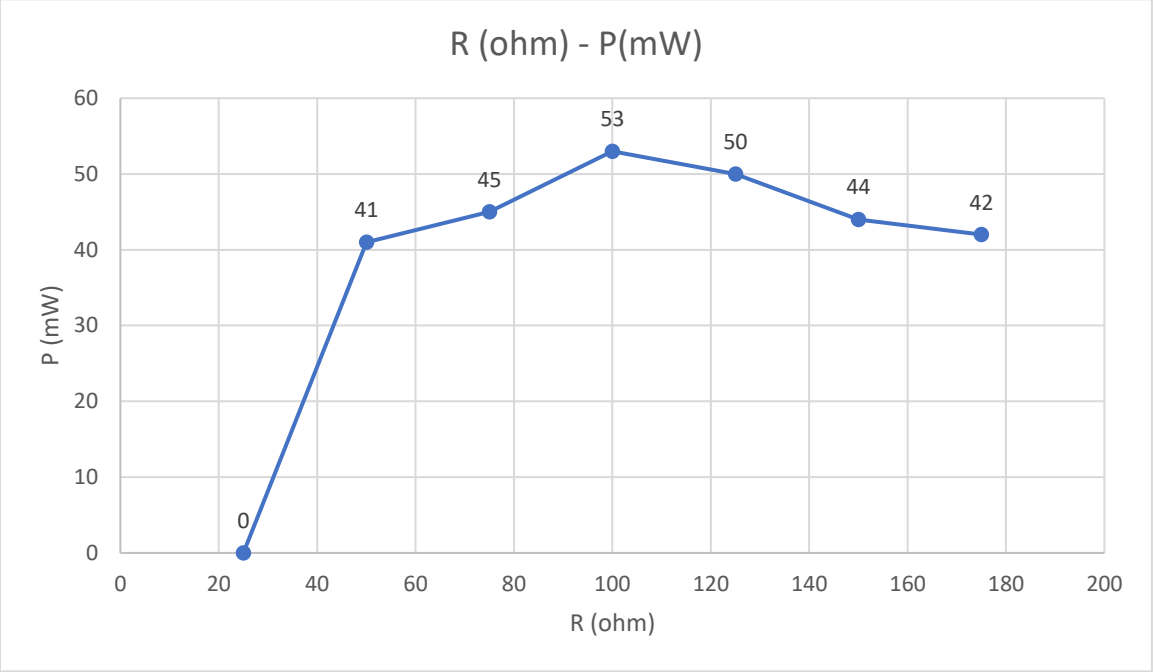
1d)

Calc. vTh (V)	Calc. RTh (Ω)	Calc. im (mA)	Calc. RN (Ω)	Meas. vTh (V)	Meas. im (mA)	Meas. Rth (Ω)	Meas. RN (Ω)
20	4.2	0.31	9.15	19.97	0.18	2.66	11.7k

Calculated and measured values are nearly the same. Difference between them stems from the resistance inside the power supply, resistance inside the cables and the measurement errors.

2a)

R	mA	V	mW
25	31	1.2	37.8
50	29	1.4	42
75	25	1.8	45
100	23	2.3	53
125	20	2.5	50
150	17	2.6	44
175	15	2.8	42



As we expected we observe that maximum power transfer is at 100 ohms. This is similar with the values that we calculated in the prework. Thus, this graph is consistent with prelab expectations.

Conclusion:

We learned how to use Thevenin and Norton equivalents by separating the certain parts of the circuit.

We learned what is maximum power transfer and that we observe max. power transfer when R (L) = R (th).

We compared our results with the prework and we realized that there might be differences due to cable resistance and power supply resistance. Other than the differences between values, what we measured in the lab was quite similar with the prework results, as expected.