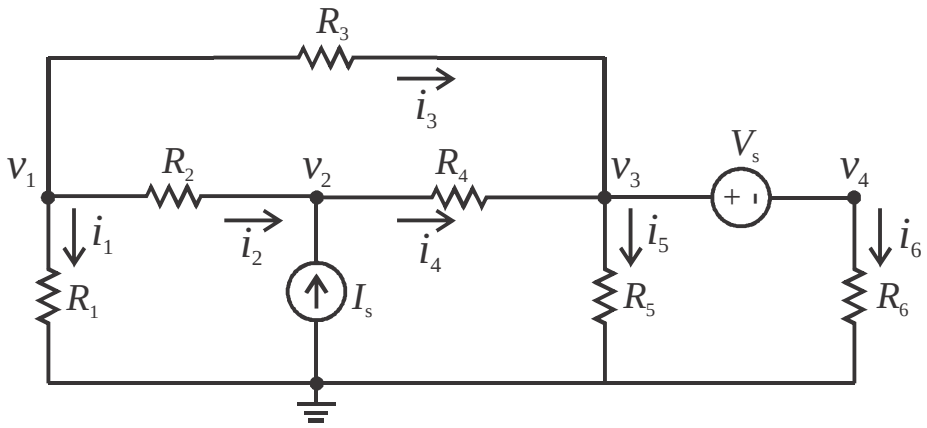
EE 220/220L Circuits I (Fall 2019)
Laboratory 4 Nodal Analysis



PRELIMINARY

1) Use **nodal analysis** to find the labeled node voltages v_1, v_2, v_3, and v_4 with respect to the reference node (ground). Given: V_s = 18 V, I_s = 8.0 mA, R_1 = 470 Ω, R_2 = 220 Ω, R_3 = 680 Ω, R_4 = 680 Ω, R_5 = 1 kΩ, and R_6 = 330 Ω. SHOW **ALL** WORK IN LOGBOOK!
2) Use the results of part 1 to find the labeled branch currents i_1 through i_6.
3) Calculate the power absorbed by each resistor and source (remember passive sign convention). Does the power absorbed by any resistor exceed **0.125 W**? If so, which one(s)?
4) Have the lab instructor sign off on your preliminary before you begin the experiment.

EXPERIMENT

1) Measure and record the actual values of each resistor.
2) Build the circuit on the pegboard with the resistors in the same arrangement as shown in the circuit. If necessary, ask the lab instructor or a TA for help in configuring the sources.
3) Measure and record the actual source current & voltage, node voltages, and branch currents.
4) Have the lab instructor or a TA sign-off on your data before you tear down the circuit.

SUMMARY/CONCLUSIONS

- Prepare **four** neat tables in your logbook listing: 1) resistor values & source values, 2) node voltages, 3) branch currents, and 4) power absorbed by each circuit element. Format: Variable name in first column, analytic (i.e., calculated/nominal) values in second column, measured values in third column, and percent difference between the calculated/nominal and measured values in fourth column. **Note:** % difference = | measured - analytic | / |analytic| *100%.
- Analyze the data and discuss the results, e.g., explain differences between predicted and measured values.