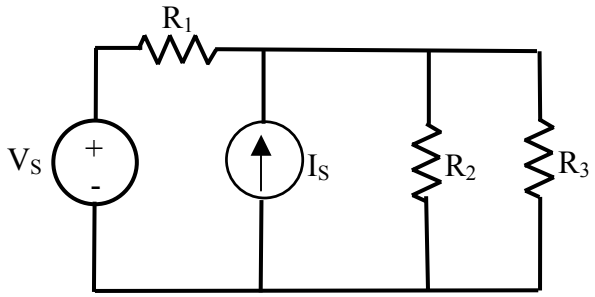
EE301/303 SP09 Homework Set 5 Due: Fri., Mar. 6, 2009

Problems cover, Thevenin and Norton equivalent circuits, superposition and maximum power transfer.

Problem 1



Given:

$R_1 = 2.2\ k\Omega$, $R_2 = 6.8\ k\Omega$

$R_3 = 10\ k\Omega$, $V_S = 40\ V$,

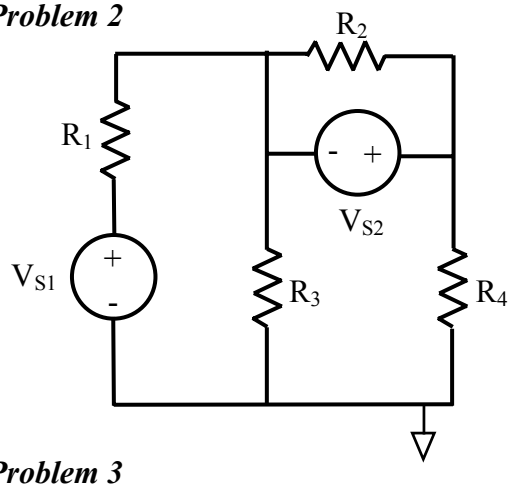
$I_S = 6\ mA$

R_3 is the load resistor

Find: R_T, V_T, I_N Independently

Do Not Use $V_T = R_T I_N$

Problem 2



Given:

$R_1 = 2\ \Omega$, $R_2 = 1\ \Omega$

$R_3 = 2\ \Omega$, $R_4 = 1\ \Omega$,

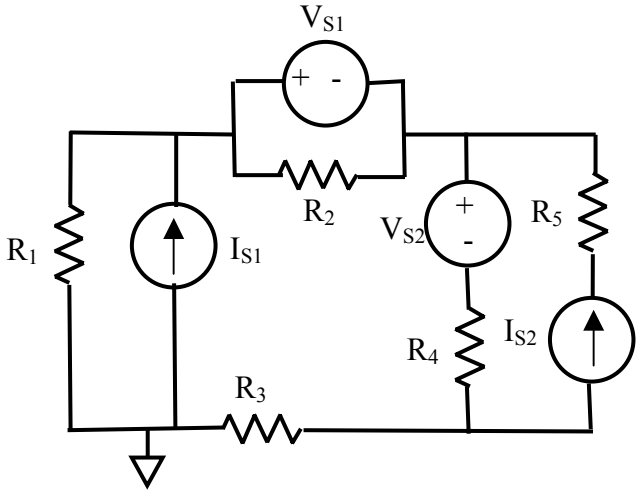
$V_{S1} = 5\ V$, $V_{S2} = 2V$

R_4 is the load resistor

Find: R_T, V_T, I_N

Do Not Use $V_T = R_T I_N$

Problem 3



Given:

$R_1 = 10\ \Omega$, $R_2 = 8\ \Omega$, $R_3 = 4\Omega$,

$R_4 = 6\ \Omega$, $R_5 = 9\ \Omega$, $V_{S1} = 40\ V$

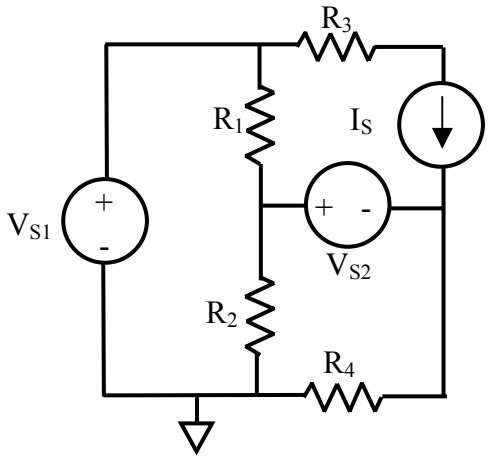
$V_{S2} = 50\ V$, $I_{S1} = 2\ A$, $I_{S2} = 4\ A$

R_3 is the load resistor

Find: R_T, V_T, I_N Independently

Do Not Use $V_T = R_T I_N$

Problem 4



Given:

$R_1 = R_2 = 10\ k\Omega$,
$R_3 = 2\ k\Omega$, $R_4 = 1\ k\Omega$,
$V_{S1} = 12\ V$, $V_{S2} = 0.5V$
$I_S = 2.5\ mA$

Find using superposition:

- i_{R1}, V_{R3},

Problem 5

Given:

- **Using the Thevenin equivalent circuit** (voltage divider) and the values for V_T and R_T found in Problem 1.

Find:

- The equation for the power absorbed by the load in terms of V_T, R_T and R_L.
- Plot the power to the load for R_L – chose the range so it is reasonable and you see a maximum.
- What is the value of R_L for maximum power delivered to the load?