

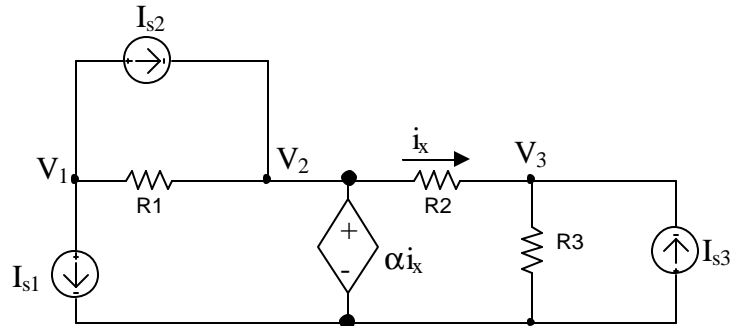
UNIVERSITY OF UTAH
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT

ECE 1270

HOMEWORK #4

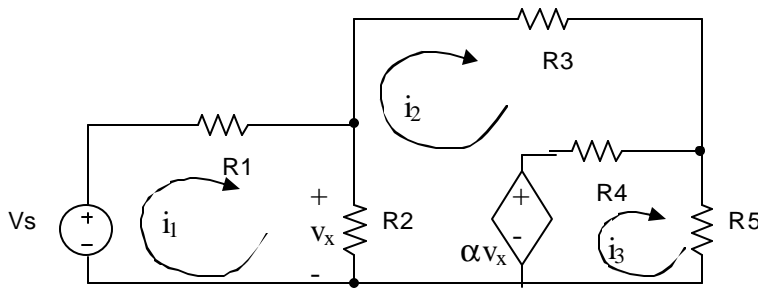
Spring 2008

1. For the circuit shown at the right, write three independent equations for the node voltages V_1 , V_2 , and V_3 . The quantity i_x must not appear in the equations. The equations must not contain more than the parameters α , I_{s1} , I_{s2} , I_{s3} , R_1 , R_2 , and R_3 .



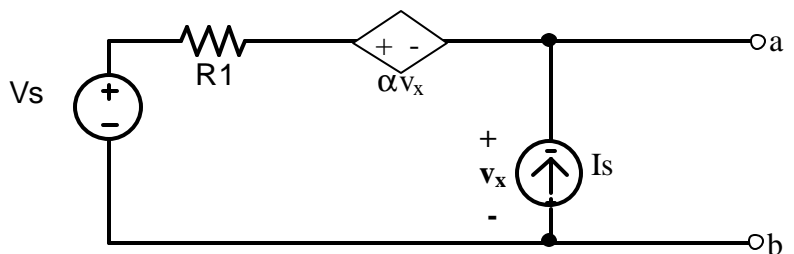
2. Make a consistency check on your equations for part 1 by setting parameter α , resistors (R_1 , R_2 , R_3) and/or sources (I_{s1} , I_{s2} , I_{s3}) to values for which the values of V_1 , V_2 , and V_3 are obvious. State the values of resistors, sources, and for your consistency check, and show that your equations for problem 1 are satisfied for these values. (In other words, plug the values into your equations for problem 1 and show that the left side and the right side of each equation are equal.)

3.



For the circuit shown, write three independent equations for the three mesh currents i_1 , i_2 , and i_3 . The quantity v_x must not appear in the equations.

4. Find the Thevenin equivalent circuit at terminals a-b for the circuit on the right. v_x must not appear in your solution. The expression must not contain more than circuit parameters α , V_s , R_1 , R_2 , and R_3 .



Note: $0 < \alpha < 1$.

5. Calculate the power in the $\frac{v_x}{2}$ dependent source. State whether the source is **absorbing** or **supplying** the power.

