EE301/303 FA08  Homework Set 4  Due: Friday, Oct. 10, 2008

Note: **Be very clear about the directions of current and polarity of voltages. Use Mesh Analysis for all problems.**

**Text Problems:** Rework using mesh analysis – Find all the mesh currents.

3.10

**Other Problems:**

**Problem 1**

![Diagram of Problem 1]

Given:
- $R_1 = 2.2 \, \text{k\Omega}$,
- $R_2 = 1.5 \, \text{k\Omega}$,
- $R_3 = 3.3 \, \text{k\Omega}$,
- $R_4 = 1 \, \text{k\Omega}$,
- $R_5 = 1 \, \text{k\Omega}$,
- $R_6 = 3.3 \, \text{k\Omega}$,
- $V_S = 12 \, \text{V}$

Find using Mesh Analysis:
- All the mesh currents
- The current through $R_3$ and $R_5$.
- The voltage across $R_3$ and $R_4$.
- The current through the source.

**Problem 2**

![Diagram of Problem 2]

Given:
- $R_1 = 10 \, \text{\Omega}$,
- $R_2 = 20 \, \text{\Omega}$,
- $R_3 = 30 \, \text{\Omega}$,
- $R_4 = R_5 = 15 \, \text{\Omega}$,
- $I_S = 2 \, \text{A}$

Find using Mesh Analysis:
- All the mesh currents
- The current through $R_3$ and $R_4$.
- The voltage across $R_3$ and $R_1$.
- The voltage across the source.

**Problem 3**

![Diagram of Problem 3]

Given:
- $R_1 = 2.2 \, \text{k\Omega}$,
- $R_2 = 1.5 \, \text{k\Omega}$,
- $R_3 = 3.3 \, \text{k\Omega}$,
- $R_4 = 1 \, \text{k\Omega}$,
- $R_5 = 1 \, \text{k\Omega}$,
- $R_6 = 3.3 \, \text{k\Omega}$,
- $V_S = 12 \, \text{V}$

Find using Mesh Analysis:
- All the mesh currents
- The current through $R_3$ and $R_5$.
- The voltage across $R_3$ and $R_4$.
- The current through the source.

Given:
- $R_1 = 2 \, \text{\Omega}$,
- $R_2 = 1 \, \text{\Omega}$,
- $R_3 = 2 \, \text{\Omega}$,
- $R_4 = 1 \, \text{\Omega}$,
- $V_{S1} = 5 \, \text{V}$,
- $V_{S2} = 2 \, \text{V}$

Find using Mesh Analysis:
- All the mesh currents.
- The current through $R_2$ and $R_4$.
- The voltage across $R_4$ and $R_1$.
- The current through the voltage sources.
Problem 4

Given:
\[ R_1 = 2.2 \, k\Omega, \quad R_2 = 6.8 \, k\Omega \]
\[ R_3 = 10 \, k\Omega, \quad V_S = 40 \, V \]

Find using Mesh Analysis:
- All the mesh currents
- The current through \( R_1 \) and \( R_2 \).
- The voltage across \( R_2 \) and \( R_3 \).
- The current through the current source and voltage source.
- The voltage across the current source

Problem 5

Given:
\[ R_1 = 10 \, \Omega, \quad R_2 = 8 \, \Omega, \quad R_3 = 4 \, \Omega, \]
\[ R_4 = 6 \, \Omega, \quad R_5 = 9 \, \Omega, \quad V_{S1} = 40 \, V \]
\[ V_{S2} = 50 \, V, \quad I_{S1} = 2 \, A, \quad I_{S2} = 4 \, A \]

Find using Mesh Analysis:
- All the mesh currents
- The current through \( R_2 \) and \( R_4 \).
- The voltage across \( R_2 \) and \( R_3 \).
- The current through the voltage sources.
- The voltage across the current sources.