

Answer all the questions.

- 1) The following system of equations was generated by applying the mesh current law to the circuit in the Figure 1. (12)

(12M)

$$60I_1 - 40I_2 = 200; \quad -40I_1 + 150I_2 - 100I_3 = 0; \quad -100I_1 + 130I_3 = 230$$

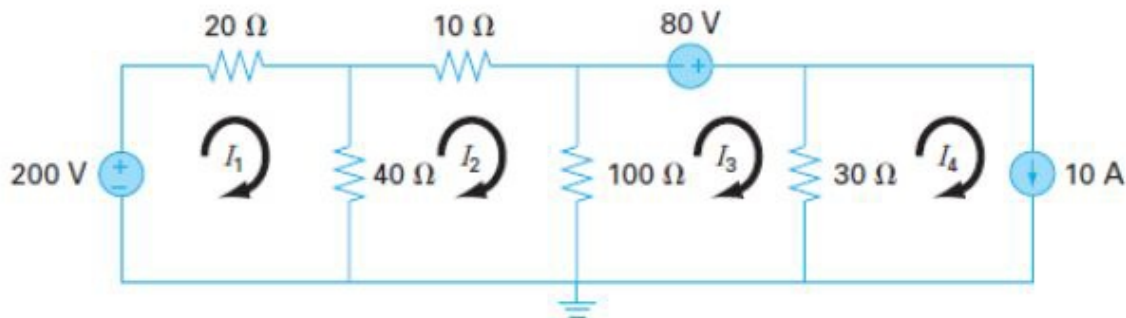


Figure 1

Solve for I_1 , I_2 and I_3 by Gauss Siedal iterative scheme.

- 2) When trying to find the acidity of a solution of magnesium hydroxide in hydrochloric acid, we obtain the following equation (12)

$$f(x) = x^3 - 0.5x^2 + 4x - 2$$

where x is the hydronium ion concentration. Find the hydronium ion concentration for a saturated solution (acidity equal to zero) using two different methods by iterative schemes. (12M)

- 3) Find the dominant eigenvalue and the eigen vector of $\begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & 1 \\ -1 & 1 & 0 \end{bmatrix}$ using power method. (13)

(13M)

- 4) Using LU Decomposition method solve $\begin{bmatrix} 1 & 1 & 1 \\ 4 & 3 & -1 \\ 3 & 5 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 6 \\ 4 \end{bmatrix}$. (13)

(13M)

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