VIT AP

Numerical Methods for Engineers [MAT2001 - 136]

Marks: 50 **Duration: 90 mins.**

MAT2001NUM

Answer all the questions.

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

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

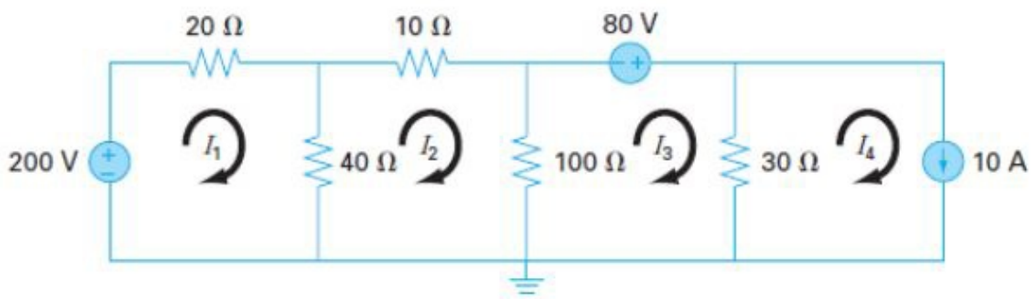

Figure 1

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 eqution (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) (13)

Find the dominant eigenvalue and the eigen vector of $\begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & 1 \\ -1 & 1 & 0 \end{bmatrix}$ using power mehod.

(13M)

4) (13)

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

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