Name: Oriolowo Oluwatobi Ojobaig.
Dept: Computer Engineering.
Matric No: 16/MHS01/219

Solution

$$\begin{bmatrix} 10M_1 - 2M_2 + M_3 = 9 \\ -2M_1 + 10M_2 - 2M_3 = 12 \\ -2M_1 - 5M_2 + 10M_3 = 18 \end{bmatrix}$$

$$M_1 = 0.2M_2 - 0.1M_3 + 0.9$$
$$M_2 = 0.2M_1 + 0.2M_3 + 1.2$$
$$M_3 = 0.2M_1 + 0.5M_2 + 1.8$$

$$\begin{bmatrix} M_1^{(k)} \\ M_2^{(k)} \\ M_3^{(k)} \end{bmatrix} = \begin{bmatrix} 0 & 0.2 & -0.1 \\ 0.2 & 0 & 0.2 \\ 0.2 & 0.5 & 0 \end{bmatrix} \begin{bmatrix} M_1^{(k-1)} \\ M_2^{(k-1)} \\ M_3^{(k-1)} \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix}$$

$$M = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

Iteration 1

$$\begin{bmatrix} 0 & 0.2 & -0.1 \\ 0.2 & 0 & 0.2 \\ 0.5 & 0.5 & 0 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} = \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix}$$

$$\begin{bmatrix} ((0\times0) + (0.2\times0) + (-0.1\times0)) + 0.9 \\ ((0.2\times0) + (0\times0) + (0.2\times0)) + 1.2 \\ ((0.5\times0) + (0.5\times0) + (0\times0)) + 1.8 \end{bmatrix} = \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix}$$

Iteration 2

$$\begin{bmatrix} M_1(2) \\ M_2(2) \\ M_3(2) \end{bmatrix} = \begin{bmatrix} 0 & 0.2 & -0.1 \\ 0.2 & 0 & 0.2 \\ 0.2 & 0.5 & 0 \end{bmatrix} \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} \times \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} = \begin{bmatrix} 0.96 \\ 1.74 \\ 2.58 \end{bmatrix}$$

$(0 \times 0.9) + (0.2 \times 1.2) + (-0.1 \times 1.8) + 0.9 = 0.96$

$(0.2 \times 0.9) + (0 \times 1.12) + (0.2 \times 1.8) + 1.2 = 1.74$

$(0.2 \times 0.4) + (0.5 \times 1.2) + (0 \times 1.8) + 1.8 = 2.58$

$$= \begin{bmatrix} 0.96 \\ 1.74 \\ 2.58 \end{bmatrix}$$

Iteration 3

$$\begin{bmatrix} M_1(3) \\ M_2(3) \\ M_3(3) \end{bmatrix} = \begin{bmatrix} 0 & 0.2 & -0.1 \\ 0.2 & 0 & 0.2 \\ 0.2 & 05 & 0 \end{bmatrix} \begin{bmatrix} 0.96 \\ 1.34 \\ 2.58 \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} = \begin{bmatrix} 0.996 \\ 1.908 \\ 2.862 \end{bmatrix}$$

$(0 \times 0.96) + (0.2 \times 1.74) + (-0.1 \times 2.38)) + 0.9 = 0.996$

$(0.2 \times 0.96) + (0 \times 1.74) + (0.2 \times 2.58)) + 1.2 = 1.908$

$(0.2 \times 0.96) + (0.5 \times 1.74) + (0 \times 2.58)) + 1.8 = 2.862$

$$= \begin{bmatrix} 0.996 \\ 1.908 \\ 2.862 \end{bmatrix}$$