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ELECT

MATHS - ENG 382 ASSIGNMENT 4

$$\begin{aligned} 10m_1 - 2m_2 + m_3 &= 9 \\ -2m_1 + 10m_2 - 2m_3 &= 12 \\ -2m_1 - 5m_2 + 10m_3 &= 18 \end{aligned}$$

$$\begin{bmatrix} 10 & -2 & 1 \\ -2 & 10 & -2 \\ -2 & -5 & 10 \end{bmatrix} \begin{bmatrix} m_1 \\ m_2 \\ m_3 \end{bmatrix} = \begin{bmatrix} 9 \\ 12 \\ 18 \end{bmatrix}$$

Initial values of $m = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$

Iteration 1

$$\begin{aligned} m_1 &= \begin{bmatrix} 0 & +0.2 & -0.1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} \\ m_2 &= \begin{bmatrix} 0.2 & 0 & 0.2 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} \\ m_3 &= \begin{bmatrix} 0.2 & 0.5 & 0 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} \end{aligned}$$

$$m_1 = 0.9$$

$$m_2 = 1.2$$

$$m_3 = 1.8$$

iteration 2

$$\begin{bmatrix} m_1 \\ m_2 \\ m_3 \end{bmatrix} = \begin{bmatrix} 0 & 0.2 & -0.1 \\ 0.2 & 0 & 0.2 \\ 0.2 & 0.5 & 0 \end{bmatrix} \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix}$$

$$m_1 = (0.2 \times 1.2) + (-0.1 \times 1.8) + 0.9 = 0.96$$

$$m_2 = (0.2 \times 0.9) + (0.2 \times 1.8) + 1.2 = 1.74$$

$$m_3 = (0.2 \times 0.9) + (0.5 \times 1.2) + 1.8 = 2.58$$

iteration 3

$$\begin{bmatrix} m_1 \\ m_2 \\ m_3 \end{bmatrix} = \begin{bmatrix} 0 & 0.2 & -0.1 \\ 0.2 & 0 & 0.2 \\ 0.2 & 0.5 & 0 \end{bmatrix} \begin{bmatrix} 0.96 \\ 1.74 \\ 2.58 \end{bmatrix} + \begin{bmatrix} 0.9 \\ 1.2 \\ 1.8 \end{bmatrix}$$

$$m_1 = (0.2 \times 1.74) + (-0.1 \times 2.58) + 0.9 = 0.99$$

$$m_2 = (0.2 \times 0.96) + (0.2 \times 2.58) + 1.2 = 1.908$$

$$m_3 = (0.2 \times 0.96) + (0.5 \times 1.74) + 1.8 = 2.8620$$