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Maths Assignment

Signature

Assignment 4

17/ENG 04/084

Ever 382

Elect/Elect

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

Therefore

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

where

$$\begin{bmatrix} m_1 \\ m_2 \\ m_3 \end{bmatrix} = \begin{bmatrix} 10 & -2 & 1 \\ -2 & 10 & -2 \\ -2 & -5 & 10 \end{bmatrix} \begin{bmatrix} m_1 = 0 \\ m_2 = 0 \\ m_3 = 0 \end{bmatrix} + \begin{bmatrix} 9.0 \\ 12 \\ 18 \end{bmatrix}$$

Using the Second Method.

Making m_1 the Sof in the equation

$$10m_1 - 2m_2 + m_3 = 9$$

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$$\therefore 10m_1 = 9 + 2m_2 - m_3$$

$$\Rightarrow m_1 = \frac{[9 + 2m_2 - m_3]}{10} \dots\dots\dots 1.)$$

making m_2 the Sof in the equation

$$-2m_1 + 10m_2 - 2m_3 = 12$$

$$\therefore 10m_2 = 12 + 2m_1 + 2m_3$$

$$\Rightarrow m_2 = \frac{[12 + 2m_1 + 2m_3]}{10} \dots\dots\dots 2.)$$

Making m_3 the Sof in the equation

$$-2m_1 - 5m_2 + 10m_3 = 18$$

$$10m_3 = 18 + 2m_1 + 5m_2$$

$$\Rightarrow m_3 = \frac{[18 + 2m_1 + 5m_2]}{10} \dots\dots\dots 3.)$$

where guess vectors of $m_0 = [0; 0; 0;]$

$$\therefore m_1 = \frac{9 + 2(0) + 0}{10} = \frac{9}{10} = 0.9$$

$$m_2 = \frac{12 + 2(0) + 2(0)}{10} = \frac{12}{10} = 1.2$$

$$m_3 = \frac{18 + 2(0) + 5(0)}{10} = \frac{18}{10} = 1.8$$

$$\therefore M_1 = [0.9; 1.2; 1.8]$$

Where $M_1 = [0.9; 1.2; 1.8]$, our new values will be

$$m_1 = \frac{9 + 2[1.2] + 1.8}{10} = \frac{9.6}{10} = 0.96$$

$$m_2 = \frac{12 + 2[0.9] + 2[1.8]}{10} = \frac{17.4}{10} = 1.74$$

$$m_3 = \frac{18 + 2[0.9] + 5[1.2]}{10} = \frac{25.8}{10} = 2.58$$

$$\therefore M_2 = [0.96; 1.74; 2.58]$$

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Where $M_2 = [0.96; 1.74; 2.58]$ our new values will be

$$m_1 = \frac{9 + 2[1.74] + 2.58}{10} = \frac{9.9}{10} = 0.99$$

$$m_2 = \frac{12 + 2[0.96] + 2[2.58]}{10} = \frac{19.08}{10} = 1.908$$

$$m_3 = \frac{18 + 2[0.96] + 5[1.74]}{10} = \frac{28.62}{10} = 2.862$$

$$\therefore M_3 = [0.99; 1.908; 2.862]$$