16/ENG04/019

09/03/19

FASHINA, Oluwadamilola T.
16/ENG04/019
ENG 382
Electrical / Electronics

Assignment 4

Solution

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

Solution

$10m_1 - 2m_2 + m_3 = 9$

making m_1 - subject of formula

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

$$m_1 = \frac{9}{10} + \frac{2m_2}{10} - \frac{m_3}{10}$$

$$m_1 = 0.9 + 0.2m_2 - 0.1m_3$$

making m_2 the formula

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

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

$$m_2 = \frac{12 + 2m_1 + 2m_3}{10}$$

$$m_2 = 1.2 + 0.2m_1 + 0.2m_3$$

making m_3 as subject of formula

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

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

$$m_3 = 1.8 + 0.2m_1 + 0.5m_2$$

Taking the initial guess value

$m_0 = [0; 0; 0]$

$m_1 = \frac{9 + 2m_2 - m_3}{10}$

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

$m_2 = \frac{12 + 2m_1 + 2m_3}{10} = \frac{12 + 2(0) + 2(0)}{10}$

$= 1.2$

$m_3 = \frac{18 + 2m_1 + 5m_2}{10}$

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

$m_1' = [0.9; 1.2; 1.8]$

Taking m_1'

$m_1 = 0.9 + 0.2m_2 - 0.1m_3$

$= 0.9 + 0.2(1.2) - 0.1(1.8)$

$= 0.96$

$m_2 = 1.2 + 0.2m_1 + 0.2m_3$

$m_2 = 1.2 + 0.2(0.9) + 0.2(1.8)$

$= 1.74$

$m_3 = 1.8 + 0.2m_1 + 0.5m_2$

$= 1.8 + 0.2(0.9) + 0.5(1.2)$

$= 2.58$

$m_2' = [0.96; 1.74; 2.58]$

Iqlung m_2'

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

$m_1 = 1.0932 \quad 1.7480 = 0.99$

$m_2 = 1.2 + 0.2m_1 + 0.2m_3$

$m_2 = 1.2 + 0.2(0.96) + 0.2(2.58)$

$= 1.908$

$m_3 = 1.8 + 0.2m_1 + 0.5m_2$

$= 1.8 + 0.2(0.96) + 0.5(1.74)$

$= 2.862$

$m_3' = [0.99; 1.908; 2.862]$

$m_1 = 0.9 + 0.2(1.908) - 0.1(2.862)$

$m_1 = 0.9954$

$m_2 = 1.2 + 0.2m_1 + 0.2m_3$

$= 1.2 + 0.2(0.99) + 0.2(2.862)$

$= 1.9704$

$m_3 = 1.8 + 0.2(0.99) + 0.5(1.908)$

$= 2.952$