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MECHATRONICS ENGINEERING

Assignment 4

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

* Rearrange to find m_1 , m_2 & m_3

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

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

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

<u>at 0 iteration</u>	<u>at 1st iteration</u>	<u>at 2nd iteration</u>
$m_1 = 0$	$m_1 = 0.9$	$m_1 = 0.96$
$m_2 = 0$	$m_2 = 1.2$	$m_2 = 1.74$
$m_3 = 0$	$m_3 = 1.8$	$m_3 = 2.58$

at 3rd iteration

$m_1 = 0.99$

$m_2 = 1.908$

$m_3 = 2.262$

MATLAB FOR JACOBI METHOD

```
- Command Window
- clear
- clc
- Syms m
- M1 = 0
- M2 = 0
- M3 = 0
- for i = 1 : 15
- for i = 1 : 20
- iter(i+1) = i
- M1(i+1) = (0.2 * M2(i)) - (0.1 * M3(i)) + 0.9
- M2(i+1) = (0.2 * M1(i)) - (0.2 * M3(i)) + 1.2
- M3(i+1) = (0.2 * M1(i)) + (0.5 * M2(i)) + 1.8
- Ea1(i+1) = abs((M1(i+1) - M1(i)) / M1(i+1)) * 100
- Ea2(i+1) = abs((M2(i+1) - M2(i)) / M2(i+1)) * 100
- Ea3(i+1) = abs((M3(i+1) - M3(i)) / M3(i+1)) * 100
- if Ea1(i+1) <= 1E-15
- Ea = ((Ea1(i+1) + Ea2(i+1) + Ea3(i+1)) / 3)
- if Ea <= 1E-15
- break
- end
- end
- tablo = [iter' xi' xi']
- tablo = [iter' M1' M2' M3' Ea']
```