

Ogborna Victor Chibuzo

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Electrical / Electronics Engineering

ENGI 382 ASSIGNMENT 1

Command window

clear

clc

format short

V = 0.5

m = 3.5

g = 9.8

F = m \* g

$$V = \text{sqrt}(\left(\frac{F}{m} + (0.02 * V)\right) * (\log(V))^3) + \frac{(10 * V) + 17150}{0.3}$$

for i = 1:inf

iter(i+1) = i

$$V(i+1) = \text{sqrt}(\left(\frac{F}{m} + (0.02 * V(i))\right) * (\log(V(i)))^3) + \frac{(10 * V(i)) + 17150}{0.3}$$

$$E_a(i+1) = \text{abs}(\left(\frac{V(i+1) - V(i)}{V(i+1)}\right) * 100);$$

if  $E_a(i+1) \leq 1E-11$

break

end

end

tablo = table(iter, 'V', 'Ea')

OUTPUT

iter	V	Ea
0	0.5	0
1	239.05	99.791
2	294.17	18.736
3	302.61	2.7894
4	303.85	0.40992
5	304.04	0.060144
6	304.06	0.0088222
7	304.07	0.0012941
8	304.07	0.00018981

CONTINUATION OF OUTPUT

iter	v	$\epsilon_n$
9	304.07	$2.7842e^{-05}$
10	304.07	$4.0838e^{-06}$
11	304.07	$8.7865e^{-08}$
12	304.07	$1.2888e^{-08}$
13	304.07	$1.8904e^{-09}$
14	304.07	$2.7727e^{-10}$
15	304.07	$4.0679e^{-11}$
16	304.07	$5.9635e^{-12}$

Converging at iter = 7; v = 304.07

Proves

$$F_{\Delta} = \frac{0.3v^2}{500 + (vV)^3} = 0.02V$$

if v = 304.07

Recall  $F_{\Delta} = 9.8 \times 3.5 = 34.30$

substituting v = 304.07

$$F_{\Delta} = \frac{0.3 \times (304.07)^2}{500 + (1 \times (304.07))^3} = 0.02(304.07)$$

$$F_{\Delta} = 40.38195931 - 6.0814$$

$$F_{\Delta} = 34.3 //$$