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Course Code: - ENGA 352

Assignment One

Command window

clear

clc

format short

v = 0.5

m = 3.5

g = 9.8

F = m * g

v = sqrt(((F + (0.02 * v)) * (log(v)^3)) + (10 * v) + 17150 / 0.3);

for i = 1: inf
iter(i+1) = i

v(i+1) = sqrt(((F + (0.02 * v(i))) * (log(v(i))^3)) + (10 * v(i) + 17150 / 0.3))

Ea(i+1) = abs((v(i+1) - v(i)) / (v(i+1) + 100));

if Ea(i+1) <= 1e-11

break

end

end

end

table = table(iter, v, 'Ea')

Output

iter	v	Ea
0	0.5	0
1	289.05	97.791
2	294.17	18.736
3	302.61	2.7894
4	303.35	0.40992
5	304.04	0.060144

6	304.06	0.0088222
7	304.07	0.012941
8	304.07	0.00018981
9	304.07	1.7842e-05
10	304.07	4.0833e-06
11	304.07	8.7865e-08
12	304.07	1.2888e-08
13	304.07	1.8904e-08
14	304.07	2.727e-10
15	304.07	4.0679e-11
16	304.07	5.9635e-12

Converging at iter 27; $V = 304.07$

Proof

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

If $V = 304.07$

Recall $E_{\Delta} = 9.8 \times 3.5 = 34.3$

Substituting $V = 304.07$

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

$$= 40.38195931 - 600814$$

$$F_{\Delta} = 34.3$$