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ENG 382 Assignment 1

Command window

clear

clc

format short

m = 3.5;

v = 0.5;

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);

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

if Er (i+1) <= 1E-11

break

end

end

Tableid = table (Iter', v', Er')

Output:

Iter	✓	Ea
0	0.5	0
1	239.05	99.791
2	296.67	18.736
3	302.61	2.7894
4	303.85	0.40992
5	304.04	0.60164
6	304.06	0.0088222

7	30k.07	0.0012941
8	30k.07	0.00018981
9	30k.07	2.7862e-05
10	30k.07	4.0838e-06
11	30k.07	8.7865e-08
12	30k.07	1.2888e-08
13	30k.07	1.8904e-09
14	30k.07	2.7727e-10
15	30k.07	4.0679e-11
16	30k.07	8.4635e-12

Converging at iter = 7, $V = 30k.07$

Prove

$$f_v = \frac{0.3v^2}{500 + (\ln v)^3} - 0.02v$$

IF $v = 30k.07$

recall $f_0 = 9.8 \times 3.5 = 34.30$

Substituting $v = 30k.07$

$$f_0 = \frac{0.3 \times (30k.07)^2}{500 + (\ln(30k.07))^3} - 0.02(30k.07)$$

$$f_0 = 40.38195931 - 6.0814$$

$$f_0 = 34.30$$