

Command window

clear

clc

format short

V = 0.5

m = 3.5

g = 9.8

F = m * g

$V = \sqrt[3]{\frac{F}{m} \left((C(F + (0.02 * V)) * ((\log(V)^2)) + (10 * V) + (7.50 / 0.3)) \right)}$

for i = 1: Inf

iter (i+1) = i

$V(i+1) = \sqrt[3]{\frac{F}{m} \left((C(F + (0.02 * V(i))) * (\log(V(i)))^2) + (10 * V(i)) + (7.50 / 0.3) \right)}$

$E_a(i+1) = \frac{abs((V(i+1) - V(i)) / V(i+1)) * 100}{1}$

if E_a(i+1) <= 1E-4

break

end

end

table = table(iter, V, E_a)

Output

iter	V	Ea
0	0.5	0
1	2.34.05	99.79
2	294.17	18.736
3	302.6	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	0.00018951
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 of iter = 7 ; $V = 304.07$

Prove

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

if $V = 304.07$

Recall $F_D = 9.8 \times 3.5 = 34.30$

Substituting $V = 304.07$

$$F_D = \frac{0.3 \times (304.07)^2}{500 + (\ln(304.07))^3} - 0.02(304.07)$$

$$F_D = 40.38195931 - 6.0814$$

$$F_D = 34.3 //$$