

Command window

clear

clc

format short

V = 0.5

m = 3.5

a = 9.8

f = m * a

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

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

Output

Iter	V	Ea
0	0.5	0
1	239.05	99.791
2	284.17	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
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

Probe

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

$$\text{if } V = 304.07$$

$$\text{Recall } FD = 9.8 \times 3.5 = 34.30$$

$$\text{Substituting } V = 304.07$$

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

$$FD = 40.38195931 - 660814$$

$$FD = 34.3$$