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ENG 382 Assignment one Solution

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)) + 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

table = 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
9	304.07	2.7842 e-05
10	304.07	4.0838 e-06
11	304.07	8.7865 e-08
12	304.07	1.2888 e-08
13	304.07	1.8904 e-09
14	304.07	2.7727 e-10
15	304.07	4.0679 e-11
16	304.07	5.9635 e-12

Converging at iter = 7 ; $V = 304.07$

prove

$$F_D = \frac{0.3V^2}{500 + (\ln V)^3} \quad 0.62V$$

if $V = 304.07$

Recall $F_D = 9.8 \times 3.5 = 34.30$

Substituting $V = 304.07$

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

$$F_D = 40.38195931 - 6.0814$$

$$F_D = 34.30$$