

Abdul-Hamid Ims assignment

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17/ENG061040

Mechanical Engineering

ENG 382

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) + (175)/(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)) + (175)/(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	2.7842e-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

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

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

$$\therefore \text{Recall } F_D = 9.8 \times 3.5$$

$$F_D = 34.30$$

Substituting $V = 304.07$

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

$$F_D = 40.38195731 - 6.00814 = 34.3$$