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CIVIL ENGINEERING

ENGR 382, Assignment 1

1) Command window

clear

clc

format short

v = 0.5

m = 3.5

g = 9.8

F = m * v * g

v = 1/2 * sqrt((C * F + (0.02 * v)) * (C * log(v) * 3)) + (10 * v) + 1.75 / 0.3);

for i = 1: inf

v(i+1) = v;

v(i+1) = 1/2 * sqrt((C * F + (0.02 * v(i))) * (C * log(v(i)) * 3)) + (10 * v(i)) + 1.75 / 0.3);

A = 1.75 / 0.3;

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

if Ea(i+1) <= 1e-7

break

end

end

table > table('v', Ea)

Output

iter	μ	ξ
0	0.5	0
1	239.05	99.771
2	304.17	18.736
3	302.61	2.7870
4	305.55	0.40972
5	304.04	0.060149
6	304.02	0.0058202
7	304.07	0.0012948
8	304.07	0.00018981
9	304.07	2.782e-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	4.069e-11
16	304.07	5.9638e-12

Convergence of iter 7; $\mu = 304.07$

Proof

$$f_1 = 0.3 \mu^2 \quad \mu = 304.07$$

of $\mu = 304.07$

Recall $f_2 = 9.8 \times 3.8 = 34.36$

Substituting $\mu = 304.07$

$$f_2 = \frac{0.3 \times (304.07)^2}{500 + (\ln(304.07))^3}$$

$$f_2 = 4038195951.60514$$

$$\Delta = 34.36$$