

Okimute Kwaterway

17/ENG03/056

Civil Engineering

ENG 382 Assignment

Command window

clear

clc

format short

V = 0.5

m = 3.5

q = 9.8

F = m * q

V = sqrt(((F + (0.02 * V)) * (log(V)^3)) + (10 * V) + 17150) / 0.3);

for i = 1:inf

iter Ci+1 = i

V Ci+1 = sqrt(((F + (0.02 * Vci)) * (log(Vci))^3) + (10 * Vci) + 17150) / 0.3);

Ea Ci+1 = abs((Vci+1) - Vci) / Vci+1 * 100;

if Ea Ci+1 <= 1E-11

break

end

end

table = table(Iter, V, Ea)

Output

Output

iter	V	Ea	iter	V	Ea
0	0.5	0	0	0.5	0
1	239.05	99.791	1	239.05	99.791
2	294.17	18.736	2	294.17	18.736
3	302.61	2.7894	3	302.61	2.7894
4	303.85	0.40992	4	303.85	0.40992
5	304.04	0.060144	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

$$F_0 = \frac{0.3v^2}{500 + (\ln v)^3} - 0.02v$$

If $v = 304.07$

Recall $F_0 = 9.8 \times 3.5 = 34.30$

Substituting $v = 304.07$

$$F_0 = \frac{0.3 \times (304.07)^2}{500 + (\ln(304.07))^3} - 0.02(304.07)$$

$$F_0 = 40.38195931 - 6.0814$$

$$F_0 = 34.3$$