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Solution:

Command Window

clear

clc

format short

N = 0.5

m = 3.5

q = 9.8

F = m + q

$$V = \sqrt[3]{(cccf + (0.0 * V)) * ((\log(V))^3) + (10 * V) + (7/50) / 0.3};$$

for i = 1 : Inf

iter(i+1) = i

$$V(i+1) = \sqrt[3]{(cccf + (0.02 * V(i))) * ((\log(V(i)))^3) + (10 * V(i)) + (7/50) / 0.3};$$

$$\sum u(i+1) = \text{abs}(c(V(i+1)) - V(i)) / (V(i) * 100);$$

If $\sum u(i+1) \leq 1e-11$

break

end

end

table = table (iter; V; Ea)

Output

iter	V	Ea
0	0.5	0
1	239.05	99.791
2	294.17	18.786
3	302.61	2.7894
4	303.85	0.40992
5	304.04	0.060144
6	304.06	0.008822
7	304.07	0.0012941
8	304.07	0.00018981
9	304.07	$2.7842e^{-0.5}$
10	304.07	$4.0838e^{-0.6}$
11	304.07	$8.7865e^{-0.8}$
12	304.07	$1.2888e^{-0.8}$

Converging at iter = 7; $V = 304.7$
Prove

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

$$500 + (\ln V)^3$$

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

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

Substituting $V = 304.07$

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

$$500 + (\ln(304.07))^3$$

$$FP = 40.3816 - 6.60814$$

$$FP = \underline{\underline{34.3}}$$