

NTAMU TIMOTHY E.
17/ENG01/018
CHEMICAL ENGR.

ASSIGNMENT

Solution

Command window

clear

clc

format short

v = 0.5

m = 3.5

g = 9.8

F = m + g

v = sqrt(ccccF + (0.02 + v) * (log(v, 10)) + (c0 + v) + 17150) / 0.3;

for p = 1 : 10

i = 0; v(i+1) = v

v(i+1) = sqrt(ccccF + (0.02 * v(i)) * (log(v(i), 10)) + (10 * v(i) + 17150))

Eg(i+1) = abs(ccc + v(i+1) - v(i)) / v(i+1) * 100;

if Eg(i+1) <= 1e-11

break

end

end

Table = table('iter', 'v', 'Ea')

Output

iter	v	Ea
0	0.5	0
1	239.05	91.791
2	294.17	18.736
3	302.61	2.7894
4	303.85	0.40992
5	304.04	0.060144

6	304.04	0.0088222
7	304.06	0.0012941
8	304.07	0.00018981
9	304.07	2.7642e-05
10	304.07	4.0838e-06
11	304.07	8.7865e-08
12	304.07	1.8888e-08
13	304.07	1.8904e-09
14	304.07	2.7707e-10
15	304.07	4.0679e-11
16	304.07	5.7635e-12

Converging at $u=7$; $v=304.07$
 Proof

$$F_A = \frac{0.3v^2}{500(1/v)^3}$$

$$1/v = 304.07$$

$$Recall E_A = 9.8 \times 3.5 = 34.3$$

$$\text{Substituting } v = 304.07$$

$$F_A = \frac{0.3 \times (304.07)^2}{500 \cdot (1/(304.07))^3} = 0.02(304.07)$$

$$F_A = 40.88195931 - 600814$$

$$F_A = 34.3$$