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DEPT: MECHATRONICS

MAT NO: 17/ENG05/041

ENG 382 Assignment 1

Solution

```
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);
  + 17150/0.3)j
    for i = 1: int
    iter (i+1) = i
V = (i+1) = Sqrt ((((F +(0.02* V(i))) * (log(V(1))^3)
          + (10* V(i)) + 17150/0.3);
Ea(i+1) = abs (((V(i+1) - v(i))/v(i+1)* 100);
if  Ea (i+1) <= 1E-11
    break
end
end
tablo = 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	$2.7842 e^{-05}$
10	304.07	$4.0838 e^{-06}$
11	304.07	$5.7865 e^{-08}$
12	304.07	$1.2888 e^{-08}$
13	304.07	$1.8904 e^{-09}$
14	304.07	$2.7727 e^{-10}$
15	304.07	$4.0679 e^{-11}$
16	304.07	$5.9635 e^{-12}$

Converging at Iter = 7; V = 304.07

Prove

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

if V = 304.07

Recall $F_n = 9.8 \times 3.5 = 34.30$

Substituting V = 304.07

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

~~$= 0.02 (304.07)$~~

$F_A = 40.381\,959\,31 - 6.008\,14$

$F_A = 34.3$