ASITA OBOMISO

17/ENG06/014 MECHATRONICS ENGINEERING

15th OF MARCH, 2020

ENG 382 (ENGINEERING MATHS)

ASSIGNMENT 1

```
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);
For i = 1:int
iter (i+1) = i
V(i+1) = sqrt ((((F + (0.02* v(i))) * (Log(v(i))^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	0.00018941
9	304.07	2.7842 e-05
10	304.07	4.0838 e-06
11	304.07	8.7865 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

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

If V = 304.07

Recall $F_D = 9.8 \times 3.5 = 34.30$

Substituting V = 304.07

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

$F_D = 40.38195931 - 6.0814$

$= 34.3006_{//}$