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17/ENG06101b
Mechanical Engineering
ENG 382 Assignment

Command window

```
clear
clc
format Short
v = 0.5
m = 3.5
g = 9.8
F = m*g
v = sqrt((((F+(0.02*v[illegible]))*((log(v)^5))+(10*v)+17150/0.3);
for i = 1:inf
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	0.00018981
9	304.07	2.7842e-05
10	304.07	4.0858e-06

11	304.07	8.7865e-08
12	304.07	1.2888e-08
13	304.07	1.8904e-09
14	304.07	2.7727e-60
15	304.07	4.0679e-11
16	304.07	5.9635e-12

Converging at inter = 7 ; V = 304.07

Proven

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

if $v = 304.07$

Recall

$$F_D = \frac{0.3 \times (304.07)^2}{500 + (\ln(304.07))^3} = 0.02\,(304.09)$$

$$F_D = 40.38195931 - 600814$$

$$F_D = 34.3$$