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17/ENG01/021

MECHANICAL ENGINEERING
ENG 382 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);
  for i=1:inf
  iter(i+1)=i
Vi(i+1)=sqrt((((F+(0.02*Vi)))*(log(Vi)))^3)+(10*Vi))
+17150/0.3); Ea(i+1)=abs((Vi(i+1)-Vi)/Vi(i+1))*(a
  if Ea(i+1)<=1E-11
    break
  end
end
table=table(iter',V,Ea)
```

OUTPUT

Iter	V	ε_a
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	4.0838e-06
11	304.07	5.9895e-07
12	304.07	1.2886e-08
13	304.07	1.8904e-09
14	304.07	2.7727e-10
15	304.07	4.0679e-11
16	304.07	5.9635e-12

Converging to: $V = 304.07$. Prove,

$F_o = 0.3V^2/500t(\ln V)^3 - 0.02V$

If $V = 304.07$. Recall $F_o = 9.8 \times 3.5 = 34.30$

Substituting $V = 304.07$

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

$F_o = 40.381959931 - 6.0814$

$F_o = 34.3$ //