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Mat no: 17/ENG06/075
Course code: ENG382

IMRAN USMAN SUMBA ELECT/ELECT 17/ENG04/067

```
Command window
Clear
Clc
format short
  v = 0.5
  m = 3.5
a = 9.8
  F = m*a
  v = sqrt((((F + (0.02*v)((log(v) ^3)) + 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-4
      break
   end
  end
table = Table(Iter,'v', Ea')
```

OUTPUT

Iter	V	E_a
0	0.5	0
1	239.05	99.701
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	8.7865e-08
12	304.07	1.2888e-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 at iter = 7; V = 304.07

Prove

$$\bar{F}_D = \frac{0.3v^2}{500 + (\ln v)^3} - 0.02v \quad \text{--- (1)}$$

if v = 304.07

Recall $\bar{F}_g$ = [illegible] * c1 = 9.81 × 3.5 = 34.30N

Substituting v = 304.07 into eqn(1)

$$\therefore \bar{F}_D = \frac{0.3(304.07)^2}{500 + (\ln(304.07))^3} - 0.02(304.07)$$

$$F_D = 40.38195931 - 6.0814$$

$$\bar{F}_D = 34.3\text{N}$$