

17/ENG04/023

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ENG 382

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: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

table = table(iter', V', Ea')

OUTPUT

iter	V	Fa
0	0.5	
1	239.05	99.791
2	294.17	18.736
3	302.61	2.7894
4	303.85	0.40992
5	304.07	0.060144
6	304.07	0.6088222
7	304.07	2.7842 e^{-05} 0.0012944
8	304.07	4.0838 e^{-06} 0.00018951
9	304.07	5.7865 e^{-08} 2.7842 e^{-05}
10	304.07	1.2888 e^{-08} 4.0838 e^{-06}
11	304.07	1.8904 e^{-09} 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}

Converging at iter=7; V=304.07

$$F_D = \frac{0.3v^4}{500 + (\ln v)^3} - 0.02v$$

$$F_D = 9.5 \times 3.5 = 34.30$$

Substituting V in F_D

$$F_D = \frac{0.3 \times (304.07)^4}{500 + (\ln 304.07)^3} - 0.02(304.07)$$

$$\bar{T}_R = 34.8$$