

## Output

Iter	V	$\epsilon_f$
0	0.5	0
1	239.03	77.771
2	274.17	12.230
3	302.61	2.7874
4	303.85	0.40972
5	304.04	0.06044
6	304.06	0.0088222
7	304.07	0.0012941
8	304.07	0.00018781
9	304.07	$2.7942 \times 10^{-5}$
10	304.07	$4.0232 \times 10^{-6}$
11	304.07	$8.7265 \times 10^{-7}$
12	304.07	$1.2898 \times 10^{-7}$
13	304.07	$1.8904 \times 10^{-7}$
14	304.07	$2.7727 \times 10^{-8}$
15	304.07	$4.06798 \times 10^{-9}$
16	304.07	$5.9635 \times 10^{-10}$

Converging at Iter = 7,  $V = 304.07$

Prove

$$f_0 = \frac{0.5V^2}{500 + C_1 V} = 0.02V$$

$$\text{If } V = 304.07$$

$$\text{Recall } f_0 = 7.8 \times 3.5 = 3430$$

$$\text{Substituting } V = 304.07$$

$$f_0 = \frac{0.3 \times (304.07)^2}{500 + C_1 (304.07)} = 0.02(304.07)$$

$$f_0 = 4052175731 - 660814$$

$$f_0 = 34.3$$

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Command Window

clear

clc

format short

v = 0.5

m = 0.5

T = 9.8

f = 0.4

$$v = \sqrt[3]{\frac{1}{\rho} \left( \frac{2 \rho g h}{\rho} + C_D \rho v^2 \right) \left( \log C_D \right)^3} + (m \cdot v) + 17.5 \sqrt{0.5}$$

for i = 1:10

iter(i+1) = i

$$v = \sqrt[3]{\frac{1}{\rho} \left( \frac{2 \rho g h}{\rho} + C_D \rho v^2 \right) \left( \log C_D \right)^3} + (m \cdot v) + 17.5 \sqrt{0.5}$$

$$\sum_{i=1}^{10} v(i) = \frac{1}{\rho} \left( \frac{2 \rho g h}{\rho} + C_D \rho v^2 \right) - v(i) \left( v(i) \right)^2 = 100$$

$$f \sum_{i=1}^{10} v(i) \leq f_e - 1$$

break

end

end

table = table(iter, v, E<sub>g</sub>)