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Cv

Answer

MATLAB

Command window

clear all

clc

format long g

V = 0.5;

m = 3.5;

a = 9.8;

F = m \* a;

V = sqrt((F + 0.02 \* V) \* (log(V)^3) + (10 \* V) + 17150) / 0.8);

for i = 1:20

iter(i+1) = i

V(i+1) = sqrt((F + (0.02 \* V(i))) \* (log(V(i)))^3 + (10 \* V(i)) + 17150) / 0.8);

error(i+1) = abs((V(i+1) - V(i)) / V(i+1)) \* 100);

if error(i+1) <= 1E-11

break

end

end

Tab = table(iter', V', error')

Note:- From MATLAB, the Output, the terminal velocity  $v$   
the convergence which is;

$$v = 304.067$$

To check

$$f_D = \frac{0.3V^2}{500 + (\ln V)^3} - 0.02V$$

$$= \frac{0.3(304.067)^2}{500 + (\ln(304.067))^3} - 0.02(304.067)$$

$$= 34.299$$

$$\approx 34.3$$

$$P_D = mA$$

$$= 9.8 \times 3.5$$

$$= 34.3$$

Proved