On the MATLAB;

- Command window
- clear
- clc
- close all
- syms V
- V = 0.5
- T = 1 ; Inf
- (T+1) = T;
- V(T+1) = [((34.3 + (0.002 * V(1))] * (500 + (log(V(1)))^3 / 0.3 ^ 0.5;
- Ea(T+1) = abs((V(T+1) - V(T))/V(T+1) * 100,
- if Ea(T+1) <= 1E-11
- break
- table = [iter' V' Ea']
- The estimated terminal velocity is 304.07ms^{-1}, Substituting in (1), FD = 34.3.

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ENG 382 Assignment I

Assignment 1;
Using MATLAB program to estimate the terminal velocity:

$$F_D = \frac{0.3V^2}{500 + (\ln V)^3} - 0.02V \quad \text{---------- (1)}$$

$$F_D = mg \quad \text{---------- (2)}$$

where;
$m = 3.5kg$; $g = 9.8 m/s^2$; $V_0 = 0.5 m/s$.

$F_D = 3.5 \times 9.8 = 34.3$

Equating (1) & (2)

$$mg = 34.3 = \frac{0.3V^2}{500 + (\ln V)^3} - 0.02V$$

To make V^2 subject of the formular;

$$34.3 + 0.02V \times \frac{0.3V^2}{500 + (\ln V)^3}$$

$$0.3V^2 = (0.02V + 34.3) \times [500 + (\ln V)^3].$$

$$V^2 = \frac{(0.02V + 34.3) \times [500 + (\ln V)^3]}{0.3}.$$

$$V = \sqrt{\frac{(0.02V + 34.3) \times [500 + (\ln V)^3]}{0.3}}$$

Recall that; the initial guess value, $V_0 = 0.5 m/s$.
Using absolute percentage relative error the $\varepsilon_a (T+1) < 1E-11$.