Amuda Muhammed Oluwatayi
16/ENG07/1007
Petroleum Engineering

Assignment I

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

$$F_D = Mg = 3.5 \times 2.3 = 34.3 \text{ --- (2)}$$

equating eqn (1) & (2)

$$mg = 34.32 - \frac{.03V^2}{500 + (\ln V)^3} - 0.02V$$

making v^2 the subject of formula

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

$$0.3V^2 = (34.3 + 0.02V) * (500 + (\ln v)^3)$$

$$v^2 = (34.3 + 0.02V) * (500 + (\ln v)^3) 0.3$$

$$v = \sqrt{(34.3 + 0.02V) * (500 + (\ln v)^3)} 0.3$$

initial given value $= V_w = 0.5 ms^{-1}$

Absolute % relative Error $E_a (T+1) < 1E-11$

MATLAB

```
Command Window
clear
clc
close all
syms V
V = 0.5
T = 1 ; Inf
Vec (T+1) = T;
V(T+1) = ((34.3 + (0.002 * V(T))) * (500 + (log(Vc))^2))^0.3/0.3)^0.5;
Ea (T+1) = abs (V(T+1) - V(T)) / (V(T+1) * 100;
if Ea (T+1) <= 1E-1
break
end
table = [T' V' Ea']
```

The estimated terminal velocity is 304.07 m/s, Sub eqn (1) = 34.3