ADIGUA CHINENSO COLLINS 16/ENG07/1004

PETROLEUM ENGINEERING ENG 352

ASSIGNMENT I

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

$$f_0 = mg = 3.5 \times 2.3 = 34.3 \quad \text{---(2)}$$

Equating eqn(1) and (2)

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

Making V the subject of formula

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

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

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

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

Initial guess value = $V_w = 0.5 ms^{-1}$

Absolute % ratio error $\varepsilon a(T+1) < 1\varepsilon - 11$

MATLAB

```
Command window
clear
clc
close all
Syms v
V=0.5
T=1; Int
  (T+1)=T;
V(T+1)=[((34.3 + 0.002 * V(.))] * 500 + (log(V(T))
      n3/0.3 . 10.3
Ea(T+1) = abs((V(T+1) - V(T))/V(T+1) * log100,
If Eq(T+1) <= 1E-11
break
end
```

table = [iter v 'Ea']
Hence the estimated terminal velocity is 304.07ms$^{-1}$ Substituting in equation
$f_i = 34.3$