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16/ENG03/037

CIVIL. ENGR

ENG 282

ASSIGNMENT 1

$$F_0 = \frac{0.3v^2}{500 + (\ln v)^3} - 0.02v$$

$$F_0 = mg \quad ; m = 3.5 \text{ kg} \quad g = 9.81 \text{ m/s}^2 \quad v_0 = 0.5 \text{ m/s}$$

$$F_0 = 3.5 \times 9.81 = 34.3 \text{ N}$$

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

$$\therefore 34.3 + 0.02v = \frac{0.3v^2}{500 + (\ln v)^3}$$

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

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

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

MATLAB CODE

comment window

clear

clc

close all

Syms v

v = 0.5

for i = 1 : inf

inter Ci+1 = i

$$v_{i+1} = \left(\frac{(34.3 + (0.02 \times v_{i1})) \times (500 + (\ln(v_{i1}))^3)}{0.3} \right)^{0.5}$$

$$Ea(i+1) = \text{abs}((v_{i+1} - v_{i2}) / v_{i+1}) \times 100$$

$$\text{if } Ea(i+1) <= 1E-11$$

break

end

table = (iter' v' Ea')

Estimated terminal velocity is 304.07 m/s