

Assignment 1

Solution

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

$$F_s = Mg = 3.5 \times 9.8 = 34.3 \quad \text{--- (2)}$$

Equating eqns (1) and (2)

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

Making V the subject of the formula

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

$$0.3V^2 = (34.4 + 0.02V) * (500 + (\ln V)^3)$$

$$V^2 = ((34.4 + 0.02V) * (500 + (\ln V)^3)) / 0.3$$

$$V = \sqrt{((34.4 + 0.02V) * (500 + (\ln V)^3)) / 0.3}$$

Recall: From the question

Initial guess value, $V_0 = 0.5 \text{ m/s}$

Absolute % relative error $E_a(i+1) \leq 1\% - 11$.