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Assignment 1

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

$$F_D = mg$$

Terminal velocity is reached when the drag force = gravitational force
 $m = 3.5$, $g = 9.8 \text{ m/s}^2$

$$F_D = mg = 3.5 \times 9.8 = 34.3$$

substituting F_D in equ (1)

$$\frac{0.3v^2}{500 + (1v)^3} - 0.02v = 34.3$$

$$\frac{0.3v^2}{500 + (1v)^3} = 34.3 + 0.02v$$

$$0.3v^2 = (34.3 + 0.02v)(500 + (1v)^3)$$

$$v^2 = \frac{(34.3 + 0.02v)(500 + (1v)^3)}{0.3}$$

$$v_{i+1} = \sqrt{\frac{(34.3 + 0.02v)(500 + (1v)^3)}{0.3}}$$

at $v = 0.5$

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