

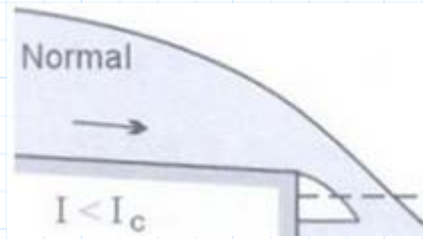
Width:  $b := 0.2 \text{ m}$

Slope:  $I := 0.002$

Manning:  $n := 0.014$

Flow:  $Q := 15.289 \frac{\text{L}}{\text{s}}$

Trapezoidal Channel:  $m_h := 1$



Depth Normal (Uniform):

Наблюдение приближения

$$\left( Q \cdot \frac{s}{m^3} \right) = \frac{\left( \left( \frac{b}{m} \right) + m_h \cdot \left( \frac{y_n}{m} \right) \right) \cdot \left( \frac{y_n}{m} \right)^{\frac{5}{3}}}{\left( \left( \frac{b}{m} \right) + 2 \left( \frac{y_n}{m} \right) \sqrt{1 + m_h^2} \right)^{\frac{2}{3}}} \cdot \sqrt{I} \cdot \frac{1}{n}$$

Решатель

$$y_n := \text{find}(y_n) = 0.101 \text{ m}$$

Depth Critical:

$$y_c := \sqrt[3]{\frac{\left( \frac{Q}{b} \right)^2}{g}} = 8.415 \text{ cm}$$

ODE the waterline:

$$f(x, y) := \frac{I - \left( \left( Q \cdot \frac{s}{m^3} \right) \cdot n \right)^2 \cdot \left( \left( \left( \frac{b}{m} \right) + 2 \left( \frac{y}{m} \right) \sqrt{1 + m_h^2} \right)^{\frac{4}{3}} \right)}{1 - \left( \left( Q \cdot \frac{s}{m^3} \right)^2 \right) \cdot \left( \left( \left( \frac{b}{m} \right) + m_h \cdot \left( \frac{y}{m} \right) \right) \left( \frac{y}{m} \right) \right)^3} \cdot \left( \frac{x}{m} \right)$$

$$x_0 := 300 \text{ cm}$$

$$y_0 := y_c$$

$$x_f := 0 \text{ cm}$$

$$N := 100$$

$$D(x, Y) := f(x, Y_0)$$

$$S := \text{rkfixed}(y_0, x_0, x_f, N, D)$$

$$T := S^{(0)}$$

$$Y := S^{(1)}$$

$$S = \begin{bmatrix} 3 \text{ m} & 0.084 \text{ m}^2 \\ 2.97 \text{ m} & 0.085 \text{ m}^2 \\ 2.94 \text{ m} & 0.085 \text{ m}^2 \\ 2.91 \text{ m} & 0.085 \text{ m}^2 \\ 2.88 \text{ m} & 0.086 \text{ m}^2 \\ 2.85 \text{ m} & 0.086 \text{ m}^2 \\ 2.82 \text{ m} & 0.086 \text{ m}^2 \\ 2.79 \text{ m} & 0.087 \text{ m}^2 \\ 2.76 \text{ m} & 0.087 \text{ m}^2 \\ 2.73 \text{ m} & 0.087 \text{ m}^2 \\ 2.7 \text{ m} & 0.088 \text{ m}^2 \\ \vdots & \end{bmatrix}$$

