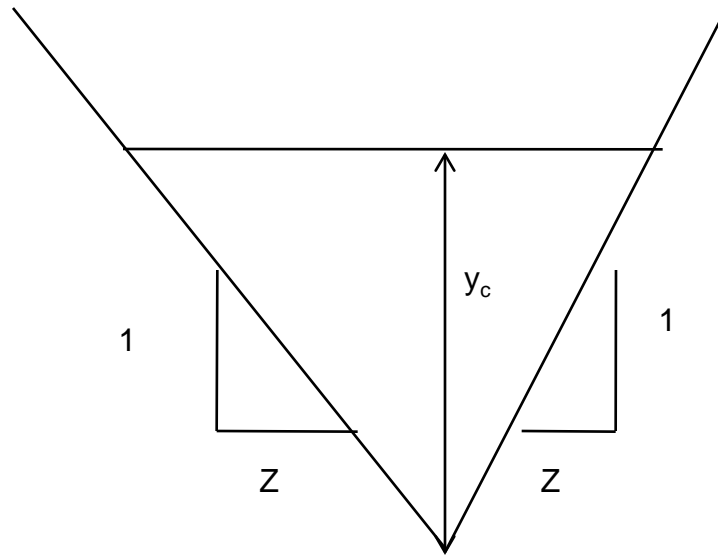


Example Problem

- Determine α_c and m_c for the case of a triangular prismatic channel



Example Problem

Contd...

Solution

$$\text{Area} = A_c = Zy_c^2 \quad \text{and} \quad y_c = \text{channel depth}$$

$$\text{Wetted perimeter} = P_c = 2y_c \sqrt{1 + z^2}$$

$$\text{hydraulic radius} = R = \frac{A_c}{P_c}$$

Substituting these into manning's Eq. given by

$$Q_c = \frac{1.49}{n} \sqrt{s} \frac{A_c^{5/3}}{P_c^{2/3}}$$

Example Problem

Contd...

$$Q_c = \frac{1.49}{n} \sqrt{s} \frac{(Z^{5/3} y_c^{10/3})}{1.59 y_c^{2/3} (1 + Z^2)^{1/3}}$$

$$Q_c = \frac{0.94}{n} \sqrt{s} \left(\frac{Z}{1 + Z^2} \right)^{1/3} (Z y_c^2)^{4/3}$$

$$Q_c = \frac{0.94}{n} \sqrt{s} \left(\frac{Z}{1 + Z^2} \right)^{1/3} (A_c)^{4/3}$$

From Eq.14, $Q_c = \alpha_c A_c^{m_c}$. Therefore,

$$\alpha_c = \frac{0.94}{n} \sqrt{s} \left(\frac{Z}{1 + Z^2} \right)^{1/3} \text{ and } m_c = 4/3$$