

Important Flood Discharge Method Formulas PDF



Formulas
Examples
with Units

List of 14 Important Flood Discharge Method Formulas

1) Catchment Area given Flood Discharge Formula ↻

Formula

$$A_{fd} = \left(\frac{Q_{fe}}{C_F} \right)^{\frac{1}{n}}$$

Example with Units

$$1.9985 \text{ m}^2 = \left(\frac{1.08 \text{ m}^3/\text{s}}{0.12625} \right)^{\frac{1}{3.1}}$$

Evaluate Formula ↻

2) Flood Coefficient given Flood Discharge Formula ↻

Formula

$$C_F = \left(\frac{Q_{fe}}{(A_{fd})^n} \right)$$

Example with Units

$$0.126 = \left(\frac{1.08 \text{ m}^3/\text{s}}{(2.0 \text{ m}^2)^{3.1}} \right)$$

Evaluate Formula ↻

3) Flood Discharge Formula ↻

Formula

$$Q_{fe} = C_F \cdot (A_{fd})^n$$

Example with Units

$$1.0825 \text{ m}^3/\text{s} = 0.12625 \cdot (2.0 \text{ m}^2)^{3.1}$$

Evaluate Formula ↻

4) Flood Frequency given Recurrence Interval Formula ↻

Formula

$$F = \frac{100}{T_r}$$

Example

$$33.3333 = \frac{100}{3}$$

Evaluate Formula ↻

5) Gumbel's Method Formulas ↻

5.1) Average Flood Discharge given Flood Discharge Having Highest Frequency Formula ↻

Formula

$$Q_{av} = Q_f + (0.45 \cdot \sigma)$$

Example with Units

$$20.288 \text{ m}^3/\text{s} = 20 \text{ m}^3/\text{s} + (0.45 \cdot 0.64)$$

Evaluate Formula ↻

5.2) Flood Discharge given Gumbel's Reduced Variate Formula ↻

Formula

$$Q_f = \left(\frac{y}{a} \right) + Q_{fe}$$

Example with Units

$$19.9755 \text{ m}^3/\text{s} = \left(\frac{37.98}{2.01} \right) + 1.08 \text{ m}^3/\text{s}$$

Evaluate Formula ↻



5.3) Flood Discharge Having Highest Frequency Formula

Formula

$$Q_f = Q_{av} - (0.45 \cdot \sigma)$$

Example with Units

$$20.002 \text{ m}^3/\text{s} = 20.29 \text{ m}^3/\text{s} - (0.45 \cdot 0.64)$$

Evaluate Formula 

5.4) Gumbel's Constant given Gumbel's Reduced Variate Formula

Formula

$$a = \frac{y}{Q_f - Q_{fe}}$$

Example with Units

$$2.0074 = \frac{37.98}{20 \text{ m}^3/\text{s} - 1.08 \text{ m}^3/\text{s}}$$

Evaluate Formula 

5.5) Gumbel's Constant given Standard Deviation Formula

Formula

$$a = \frac{1.28}{\sigma}$$

Example

$$2 = \frac{1.28}{0.64}$$

Evaluate Formula 

5.6) Gumbel's Reduced Variate Formula

Formula

$$y = a \cdot (Q_f - Q_{fe})$$

Example with Units

$$38.0292 = 2.01 \cdot (20 \text{ m}^3/\text{s} - 1.08 \text{ m}^3/\text{s})$$

Evaluate Formula 

5.7) Probability of Occurrence given Recurrence Interval Formula

Formula

$$p = 1 - \left(\frac{1}{T_r} \right)$$

Example

$$0.6667 = 1 - \left(\frac{1}{3} \right)$$

Evaluate Formula 

5.8) Recurrence Interval given Probability Formula

Formula

$$T_r = \frac{1}{1 - p}$$

Example

$$2 = \frac{1}{1 - 0.5}$$

Evaluate Formula 

5.9) Standard Deviation given Flood Discharge Having Highest Frequency Formula

Formula

$$\sigma = \frac{Q_{av} - Q_f}{0.45}$$

Example with Units

$$0.6444 = \frac{20.29 \text{ m}^3/\text{s} - 20 \text{ m}^3/\text{s}}{0.45}$$

Evaluate Formula 

5.10) Standard Deviation given Gumbel's Constant Formula

Formula

$$\sigma = \frac{1.28}{a}$$

Example

$$0.6368 = \frac{1.28}{2.01}$$



Evaluate Formula 



Variables used in list of Flood Discharge Method Formulas above

- **a** Gumbel's Constant
- **A_{fd}** Catchment Area for Flood Discharge (*Square Meter*)
- **C_F** Flood Coefficient
- **F** Flood Frequency
- **n** Flood Index
- **p** Probability
- **Q_{av}** Average Discharge (*Cubic Meter per Second*)
- **Q_f** Flood Discharge having Highest Frequency (*Cubic Meter per Second*)
- **Q_{fe}** Flood Discharge (*Cubic Meter per Second*)
- **T_r** Recurrence Interval
- **y** Gumbel's Reduced Variate
- **σ** Standard Deviation

Constants, Functions, Measurements used in list of Flood Discharge Method Formulas above

- **Measurement: Area** in Square Meter (m²)
Area Unit Conversion 
- **Measurement: Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
Volumetric Flow Rate Unit Conversion 



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