



Gumbel's Method for Prediction of Flood's Peak Formulas

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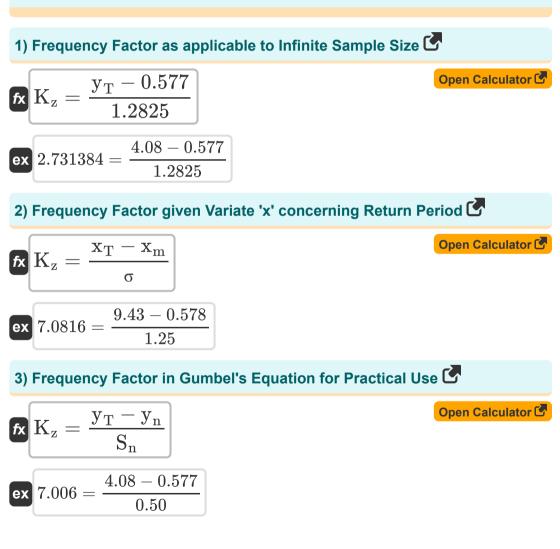
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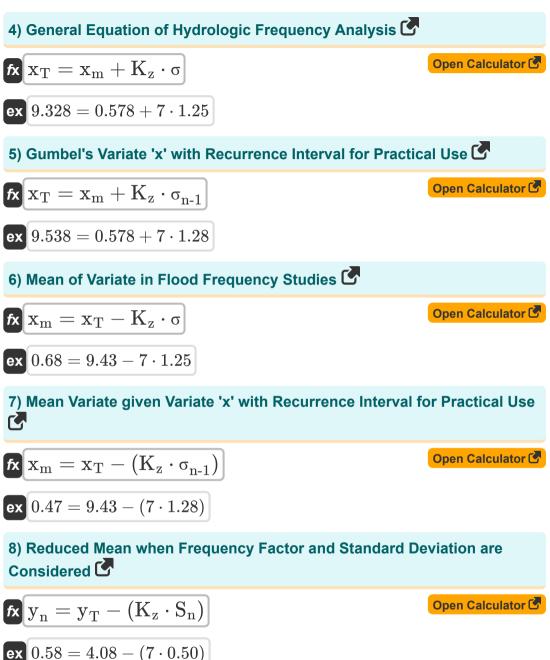


List of 22 Gumbel's Method for Prediction of Flood's Peak Formulas

Gumbel's Method for Prediction of Flood's Peak 🛃











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9) Reduced Standard Deviation when Variate and Reduced Mean is Considered 🚰

$$\begin{array}{c} \hline \textbf{K} \quad S_n = \frac{y_T - y_n}{K_z} & \mbox{Open Calculator } \textbf{K} \\ \hline \textbf{K} \quad 0.500429 = \frac{4.08 - 0.577}{7} \\ \hline \textbf{M} \quad \textbf{N} \\ \hline \textbf{M} \quad \textbf{M} \\ \hline \textbf{M} \quad \textbf{M} \\ \hline \textbf{M} \\ \textbf{M} \\$$



ex $9.537 = 7 \cdot 1.28 + 0.577$



13) Reduced Variate 'Y' for given Return Period 🕑

$$f = -\left(0.834 + 2.303 \cdot \log 10 \left(\log 10 \left(\frac{T_r}{T_r - 1}\right)\right)\right)$$
ex
$$5.008378 = -\left(0.834 + 2.303 \cdot \log 10 \left(\log 10 \left(\frac{150}{150 - 1}\right)\right)\right)$$
14) Reduced Variate 'Y' in Gumbel's Method (Arrow Section 1.285 \cdot (x_T - x_m)) + 0.577
f = 9.676856 = $\left(\frac{1.285 \cdot (9.43 - 0.578)}{1.25}\right) + 0.577$
Confidence Limits (Arrow Section 1.25)

fx
$$\mathbf{x}_1 = \mathbf{x}_\mathrm{T} + \mathbf{f}_\mathrm{c} \cdot \mathbf{S}_\mathrm{e}$$

16) Confidence Interval of Variate Bounded by X2 🕑

fx
$$\mathbf{x}_2 = \mathbf{x}_{\mathrm{T}} + \mathbf{f}_{\mathrm{c}} \cdot \mathbf{S}_{\mathrm{e}}$$
 Open Calculator P \mathbf{X} 12.43 = 9.43 + 15 \cdot 0.2





Open Calculator 🕑

Gumbel's Method for Prediction of Flood's Peak Formulas... 6/10 17) Equation for Confidence Interval of Variate Open Calculator fx $\mathrm{x}_{1} = \mathrm{x}_{\mathrm{T}} - \mathrm{f}_{\mathrm{c}} \cdot \mathrm{S}_{\mathrm{e}}$ ex $6.43 = 9.43 - 15 \cdot 0.2$ 18) Equation for Confidence Interval of Variate Bounded by x2 Open Calculator fx $\mathrm{x}_2 = \mathrm{x_T} - \mathrm{f_c} \cdot \mathrm{S_e}$ ex $6.43 = 9.43 - 15 \cdot 0.2$ 19) Equation for Variate 'b' using Frequency Factor 💪 Open Calculator fx $\mathbf{b} = \sqrt{1 + (1.3 \cdot \mathrm{K_z}) + \left(1.1 \cdot \mathrm{K_z^2}\right)}$

ex
$$8 = \sqrt{1 + (1.3 \cdot 7) + (1.1 \cdot (7)^2)}$$

20) Probable Error 🗹

fx
$$S_e = b \cdot \left(\frac{\sigma_{n-1}}{\sqrt{N}}\right)$$

ex $0.200017 = 8 \cdot \left(\frac{1.28}{\sqrt{2621}}\right)$

Open Calculator 🚰



21) Sample Size when Probable Error is Considered 🕑

fx
$$N = \left(\frac{b \cdot \sigma_{n-1}}{S_e}\right)^2$$

ex $2621.44 = \left(\frac{8 \cdot 1.28}{0.2}\right)^2$

22) Variate 'b' given Probable Error 🕑

$$\mathbf{fx} \mathbf{b} = \mathbf{S}_{e} \cdot \frac{\sqrt{N}}{\sigma_{n-1}}$$

$$\mathbf{ex} 7.999329 = 0.2 \cdot \frac{\sqrt{2621}}{1.28}$$

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Open Calculator 🕑



Variables Used

- **b** Variable 'b' in Probable Error
- **f**_c Function of Confidence Probability
- K_z Frequency Factor
- N Sample Size
- Se Probable Error
- S_n Reduced Standard Deviation
- T_r Return Period
- X1 Value of 'x1' Bounded to Variate 'Xt'
- X2 Value of 'x2' Bounded to Variate 'Xt'
- Xm Mean of the Variate X
- XT Variate 'X' with a Recurrence Interval
- y Reduced Variate 'Y'
- yn Reduced Mean
- **y_T** Reduced Variate 'Y' for Return Period
- ytf Reduced Variate 'Y' with Respect to Frequency
- **o** Standard Deviation of the Z Variate Sample
- σ_{n-1} Standard Deviation of the Sample of Size N





Constants, Functions, Measurements used

- Function: In, In(Number) Natural logarithm function (base e)
- Function: log10, log10(Number) Common logarithm function (base 10)
- Function: **sqrt**, sqrt(Number) Square root function



Check other formula lists

- Empirical Formulae for Flood-Peak Area Relationships Formulas
 - Gumbel's Method for Prediction of Flood's Peak Formulas
 - Rational Method to Estimate the Flood Peak Formulas

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