Important Risk, Reliability and Log-Pearson Distribution Formulas PDF

Formulas
Examples
with Units

List of 19
Important Risk, Reliability and Log-Pearson Distribution Formulas

1) Log-Pearson Type III Distribution Formulas

1.1) Adjusted Coefficient of Skew Formula

Evaluate Formula

Formula

$$C'_s = C_s \cdot \left(\frac{1 + 8.5}{N}\right)$$

Example

$$0.0043 = 1.2 \cdot \left(\frac{1 + 8.5}{2621}\right)$$

1.2) Coefficient of Skew of Variate Z given Adjusted Coefficient of Skew Formula

Evaluate Formula

Formula

$$C_s = \frac{C'_s}{\frac{1 + 8.5}{N}}$$

Example

$$1.2001 = \frac{0.00435}{\frac{1 + 8.5}{2621}}$$

1.3) Equation for Base Series of Z Variates Formula

Evaluate Formula

Formula

$$z_m = \log10(z)$$

Example

$$0.7853 = \log10(6.1)$$

1.4) Equation for Z Series for any Recurrence Interval Formula

Evaluate Formula

Formula

$$Z_t = z_m + K_z \cdot \sigma$$

Example

$$9.52 = 0.77 + 7 \cdot 1.25$$

1.5) Frequency Factor given Z Series for Recurrence Interval Formula

Evaluate Formula

Formula

$$K_z = \frac{Z_t - z_m}{\sigma}$$

Example

$$6.984 = \frac{9.5 - 0.77}{1.25}$$

1.6) Mean Series of Z Variates given Z Series for Recurrence Interval Formula

Evaluate Formula

Formula

$$z_m = Z_t - K_z \cdot \sigma$$

Example

$$0.75 = 9.5 - 7 \cdot 1.25$$

1.7) Partial Duration Series Formula

Evaluate Formula

Formula

$$T_P = \frac{1}{\left(\ln\left(T_A\right)\right) - \left(\ln\left(T_A - 1\right)\right)}$$

Example

$$19.4957 = \frac{1}{\left(\ln\left(20\right)\right) - \left(\ln\left(20 - 1\right)\right)}$$

1.8) Sample Size given Adjusted Coefficient of Skew Formula

Evaluate Formula

Formula

$$N = C_s \cdot \frac{1 + 8.5}{C'_s}$$

Example

$$2620.6897 = 1.2 \cdot \frac{1 + 8.5}{0.00435}$$

2) Risk, Reliability and Safety Factor Formulas

2.1) Actual Value of Parameter Adopted in Design of Project given Safety Factor Formula

Evaluate Formula

Formula

$$C_{am} = SF_m \cdot C_{hm}$$

Example

$$6 = 3 \cdot 2$$

2.2) Equation for Risk Formula

Evaluate Formula

Formula

$$R = 1 - \left(1 - p\right)^n$$

Example

$$0.0647 = 1 - \left(1 - 0.006667\right)^{10}$$

2.3) Equation for Risk given Return Period Formula

Evaluate Formula

Formula

$$R = 1 - \left(1 - \left(\frac{1}{T_r}\right)\right)^n$$

Example

$$0.0647 = 1 - \left(1 - \left(\frac{1}{150}\right)\right)^{10}$$

2.4) Equation for Safety Factor Formula

Evaluate Formula

Formula

$$SF_m = \frac{C_{am}}{C_{hm}}$$

Example

$$3 = \frac{6}{2}$$

2.5) Equation for Safety Margin Formula

Evaluate Formula

Formula

$$S_m = C_{am} - C_{hm}$$

Example

$$4 = 6 - 2$$

2.6) Probability given Return Period Formula

Evaluate Formula

Formula

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

Example

$$0.0067 = \frac{1}{150}$$

2.7) Reliability given Risk Formula

Evaluate Formula

Formula

$$R_e = 1 - R$$

Example

$$0.9353 = 1 - 0.064705$$

2.8) Reliability using Return Period Formula

Evaluate Formula

Formula

$$R_e = \left(1 - \left(\frac{1}{T_r}\right)\right)^n$$

Example

$$0.9353 = \left(1 - \left(\frac{1}{150}\right)\right)^{10}$$

2.9) Return Period given Probability Formula

Evaluate Formula

Formula

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

Example

$$149.9925 = \frac{1}{0.006667}$$

2.10) Risk given Reliability Formula

Evaluate Formula

Formula

$$R = 1 - R_e$$

Example

$$0.1 = 1 - 0.9$$

2.11) Value of Parameter obtained from Hydrological Considerations given Safety Factor Formula

Evaluate Formula

Formula

$$C_{hm} = \frac{C_{am}}{SF_m}$$

Example

$$2 = \frac{6}{3}$$

Variables used in list of Risk, Reliability and Log-Pearson Distribution Formulas above

- C_{am} Actual Value of the Parameter
- C_{hm} Value of Parameter
- C_s Coefficient of Skew of Variate Z
- C'_s Adjusted Coefficient of Skew
- K_z Frequency Factor
- **n** Successive Years
- **N** Sample Size
- **p** Probability
- **R** Risk
- R_e Reliability
- S_m Safety Margin
- SF_m Safety Factor
- T_A Annual Series
- T_P Partial Duration Series
- T_r Return Period
- **z** Variate 'z' of a Random Hydrologic Cycle
- z_m Mean of Z Variates
- Z_t Z Series for any Recurrence Interval
- **σ** Standard Deviation of the Z Variate Sample

Constants, Functions, Measurements used in list of Risk, Reliability and Log-Pearson Distribution Formulas above

- Functions: **ln**, ln(Number)
  The natural logarithm, also known as the logarithm to the base e, is the inverse function of the natural exponential function.
- Functions: **log10**, log10(Number)
  The common logarithm, also known as the base-10 logarithm or the decimal logarithm, is a mathematical function that is the inverse of the exponential function.

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