

GAMMA PDF & CDF Calculations

appVersion(3) = "0.99.7219"

$$X := \begin{bmatrix} 30.4 \\ 278.7 \\ 63.9 \\ 387.1 \\ 330 \\ 187.3 \\ 495.9 \\ 18 \\ 163.3 \\ 128.8 \end{bmatrix}$$

$$X_{mean} := \text{Mean}(X) = 208.34$$

$$LN X := \overrightarrow{\ln(X)} = \begin{bmatrix} 3.4144 \\ 5.6301 \\ 4.1573 \\ 5.9587 \\ 5.7991 \\ 5.2327 \\ 6.2064 \\ 2.8904 \\ 5.0956 \\ 4.8583 \end{bmatrix}$$

$$LN X_{mean} := \text{Mean}(LN X) = 4.9243$$

$A := \ln(X_{mean}) - LN X_{mean} = 0.4149$

$\alpha := \frac{1}{4 \cdot A} \cdot \left(1 + \sqrt{1 + 4 \cdot \frac{A}{3}}\right) = 1.3536$

$\beta := \frac{\text{Mean}(X)}{\alpha} = 153.918$

PDF

$$g(x) := \frac{1}{\beta^\alpha \cdot \text{Gamma}(\alpha)} \cdot x^{\alpha-1} \cdot e^{-\frac{x}{\beta}}$$

Eqn 1

CDF

$$G(x_val) := \frac{1}{\beta^\alpha \cdot \text{Gamma}(\alpha)} \cdot \int_0^{x_val} x^{\alpha-1} \cdot e^{-\frac{x}{\beta}} dx$$

Eqn 2

$\text{Gamma}(\alpha) = 0.8908$

$\text{Gamma}\left(\frac{1}{2}\right) = 1.7725$

$$Q(x_val) := \int_0^{x_val} g(x) dx$$

Eqn 3

$\alpha = 1.35358217$

$\beta = 153.91751239$

$$X = \begin{bmatrix} 30.4 \\ 278.7 \\ 63.9 \\ 387.1 \\ 330 \\ 187.3 \\ 495.9 \\ 18 \\ 163.3 \\ 128.8 \end{bmatrix}$$

$$\overrightarrow{G(X)} = \begin{bmatrix} 0.0825 \\ 0.738 \\ 0.1999 \\ 0.8585 \\ 0.8041 \\ 0.5677 \\ 0.9259 \\ 0.0425 \\ 0.5087 \\ 0.413 \end{bmatrix}$$

$$\overrightarrow{Q(X)} = \begin{bmatrix} 0.0729 \\ 0.6518 \\ 0.1765 \\ 0.7582 \\ 0.7101 \\ 0.5014 \\ 0.8177 \\ 0.0375 \\ 0.4493 \\ 0.3648 \end{bmatrix}$$

$$\overrightarrow{G(X)} - \overrightarrow{Q(X)} = \begin{bmatrix} 0.0096 \\ 0.0862 \\ 0.0234 \\ 0.1003 \\ 0.0939 \\ 0.0663 \\ 0.1082 \\ 0.005 \\ 0.0594 \\ 0.0483 \end{bmatrix}$$

$\sum \overrightarrow{G(X)} = 4.5402251374$

$\sum \overrightarrow{Q(X)} = 4.5402251374$

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