

GAMMA PDF & CDF Calculations

appVersion(3) = "0.99.7251"

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

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

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

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

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

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

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

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

$$\alpha = 1.35358217 \qquad \beta = 153.91751239$$

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

$$\overrightarrow{G(X)} = \begin{bmatrix} 0.0923 \\ 1.8514 \\ 0.2523 \\ 2.8893 \\ 2.3292 \\ 1.0824 \\ 4.0408 \\ 0.0454 \\ 0.8985 \\ 0.6513 \end{bmatrix}$$

$$\overrightarrow{Q(X)} = \begin{bmatrix} 0.0815 \\ 1.6351 \\ 0.2228 \\ 2.5517 \\ 2.057 \\ 0.9559 \\ 3.5687 \\ 0.0401 \\ 0.7935 \\ 0.5752 \end{bmatrix}$$

$$\overrightarrow{G(X)} - \overrightarrow{Q(X)} = \begin{bmatrix} 0.0108 \\ 0.2163 \\ 0.0295 \\ 0.3376 \\ 0.2721 \\ 0.1265 \\ 0.4721 \\ 0.0053 \\ 0.105 \\ 0.0761 \end{bmatrix}$$

$$\sum \overrightarrow{G(X)} = 12.4815868294$$

$$\sum \overrightarrow{Q(X)} = 12.4815868294$$

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