

**RIGCDF****PURPOSE**

Compute the reciprocal inverse Gaussian cumulative distribution function with shape parameter  $\gamma$ .

**DESCRIPTION**

The probability density function for the reciprocal inverse Gaussian distribution can be defined in terms of the inverse Gaussian distribution. Specifically,

$$f(x) = \frac{\text{igpdf}\left(\frac{1}{x}, \gamma\right)}{x^2} \quad \text{for } x \geq 0 \quad (\text{EQ 8-306})$$

where igpdf is the probability density function for the inverse Gaussian distribution (see the documentation for the IGPDF command in this chapter for the formula for this distribution) and  $\gamma$  is the shape parameter. As with the inverse Gaussian distribution, DATAPLOT assumes the location parameter,  $\mu$ , is 1. See topic (3) under the General considerations section at the beginning of this chapter for a discussion of generating cdf values for the general form of the distribution. The cumulative distribution can be defined as:

$$F(x, \gamma) = 1 - \text{igcdf}\left(\frac{1}{x}, \gamma\right) \quad \text{for } x \geq 0 \quad (\text{EQ 8-307})$$

where igcdf is the cumulative distribution function for the inverse Gaussian distribution.

**SYNTAX**

LET <y2> = RIGCDF(<y1>,<gamma>) <SUBSET/EXCEPT/FOR qualification>

where <y1> is a variable, a number, or a parameter containing positive values;

<y2> is a variable or a parameter (depending on what <y1> is) where the computed reciprocal inverse Gaussian cdf value is stored;

<gamma> is a positive number or parameter that specifies the shape parameter;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

**EXAMPLES**

LET A = RIGCDF(3,10)

LET Y = RIGCDF(X1,10)

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

RIGPDF	=	Compute the reciprocal inverse Gaussian probability density function.
RIGPPF	=	Compute the reciprocal inverse Gaussian percent point function.
IGPDF	=	Compute the inverse Gaussian probability density function.
IGPPF	=	Compute the inverse Gaussian percent point function.
IGCDF	=	Compute the inverse Gaussian cumulative distribution function.
NORCDF	=	Compute the normal cumulative distribution function.
NORPDF	=	Compute the normal probability density function.
NORPPF	=	Compute the normal percent point function.
WEICDF	=	Compute the Weibull cumulative distribution function.
WEIPDF	=	Compute the Weibull probability density function.
WEIPPF	=	Compute the Weibull percent point function.
FLPDF	=	Compute the fatigue-life probability density function.
FLPPF	=	Compute the fatigue-life percent point function.
FLCDF	=	Compute the fatigue-life cumulative distribution function.

**REFERENCE**

“Continuous Univariate Distributions - 1,” Johnson and Kotz, Houghton Mifflin, 1970 (chapter 15).

## APPLICATIONS

Reliability Analysis

## IMPLEMENTATION DATE

90/5 (definition of inverse Gaussian distribution was modified 95/1 to be consistent with Johnson and Kotz)

## PROGRAM

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TITLE RIGCDF FOR VARIOUS VALUES OF GAMMA
XILABEL X
YLABEL PROBABILITY
SEGMENT 1 COORDINATES 69 38 74 38; SEGMENT 1 PATTERN SOLID
SEGMENT 2 COORDINATES 69 34 74 34; SEGMENT 2 PATTERN DASH
SEGMENT 3 COORDINATES 69 30 74 30; SEGMENT 3 PATTERN DOT
SEGMENT 4 COORDINATES 69 26 74 26; SEGMENT 4 PATTERN DA2
LEGEND 1 GAMMA = 1; LEGEND 1 COORDINATES 75 37
LEGEND 2 GAMMA = 2; LEGEND 2 COORDINATES 75 33
LEGEND 3 GAMMA = 5; LEGEND 3 COORDINATES 75 29
LEGEND 4 GAMMA = .5; LEGEND 4 COORDINATES 75 25
LINES SOLID DASH DOT DASH2
YLIMITS 0 1
MAJOR YTIC MARK NUMBER 6
YTIC MARK DECIMAL 1
PLOT RIGCDF(X,1) FOR X = 0.01 0.01 3 AND
PLOT RIGCDF(X,2) FOR X = 0.01 0.01 3 AND
PLOT RIGCDF(X,5) FOR X = 0.01 0.01 3 AND
PLOT RIGCDF(X,0.5) FOR X = 0.05 0.01 3

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