CHU

PURPOSE
Compute the logarithmic confluent hypergeometric function with shape parameters A and B.

DESCRIPTION
The Handbook of Mathematical Functions (see the REFERENCE section below) defines 2 confluent hypergeometric functions M and U. This command computes the U function. See the Handbook for the definition of these functions. Note that although the Handbook defines this function for both real and complex values, DATAPLOT only computes it for real values. Many common functions can be defined as special cases of this function (see table 13.6 in the Handbook of Mathematical Functions). The input value must be a positive real number.

SYNTAX
LET <y2> = CHU(<x>,<a>,<b>)   <SUBSET/EXCEPT/FOR qualification>
where <x> is a positive number, variable, or parameter;
> <a> is a number, variable, or parameter;
> <b> is a number, variable, or parameter;
> <y2> is a variable or a parameter (depending on what <a> and <b> are) where the computed values are stored;

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

EXAMPLES
LET Z = CHU(0.01,0.1,0.2)
LET Z = CHU(1,0.1,0.2)
LET Z = CHU(0.1,-1.3,0.1)
LET Z = CHU(X,-1.3,0.1)

NOTE 1
DATAPLOT uses the routine DCHU from the SLATEC Common Mathematical Library to compute this function. SLATEC is a large set of high quality, portable, public domain Fortran routines for various mathematical capabilities maintained by seven federal laboratories.

NOTE 2
This function returns an error message if 1+A-B is close to zero and X is small. It also returns an error message if X is zero or negative.

DEFAULT
None

SYNONYMS
None

RELATED COMMANDS
BETA	=	Compute the complete Beta function.
BETAI	=	Compute the incomplete Beta function.
GAMMA	=	Compute the gamma function.
LOGGAMMA	=	Compute the log gamma function.
BESSJN	=	Compute the Bessel function of the first kind and order N.
BESSYN	=	Compute the Bessel function of the second kind and order N.
BESSIN	=	Compute the modified Bessel function of order N.
BESSKN	=	Compute the modified Bessel function of the third kind and order N.
EXPINTN	=	Compute the exponential integral.
SININT	=	Compute the sine integral.
COSINT	=	Compute the cosine integral.

REFERENCE
"Handbook of Mathematical Functions, Applied Mathematics Series, Vol. 55," Abramowitz and Stegun, National Bureau of Standards, 1964 (chapter 13).

APPLICATIONS
    Special Functions

IMPLEMENTATION DATE
    94/9

PROGRAM
    TITLE AUTOMATIC
    MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
    LET A = 0.1; LET B = 0.2
    X1LABEL A = ^A
    X2LABEL B = ^B
    PLOT CHU(X,A,B) FOR X = 0.1 0.1 10
    LET A = 2.0; LET B = 1.0
    X1LABEL A = ^A
    X2LABEL B = ^B
    PLOT CHU(X,A,B) FOR X = 0.1 0.1 10
    LET A = -0.4; LET B = 2
    X1LABEL A = ^A
    X2LABEL B = ^B
    PLOT CHU(X,A,B) FOR X = 0.1 0.1 10
    LET A = 1; LET B = -2
    X1LABEL A = ^A
    X2LABEL B = ^B
    PLOT CHU(X,A,B) FOR X = 0.1 0.1 10
    END OF MULTIPLOT