

ISTITUTO NAZIONALE DI FISICA NUCLEARE
Laboratori Nazionali di Frascati

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L. Trasatti: A GRAPHIC HISTOGRAM SUBROUTINE
FOR CANDI 2

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A general purpose BASIC subroutine is difficult to write for two reasons:

1. Line numbers should not be the same as the user program.
2. Variable names should be different from the variable names of the user program.

DRA 1: [CAUS]CAN2HIST.BAS (Password = USER) is an attempt to overcome these difficulties by two methods: Line numbers are > 30000 and all variable names start with the letter Z. Therefore, to be able to access it, the user must only avoid line numbers higher than 29999 and variable names starting by Z.

You can load CAN2HIST.BAS directly using the LOAD2 utility (which does not erase the existing program, but only overwrites lines with equal line number), after loading your own program.

CAN2HIST.BAS is a histogram subroutine using the CANDI 2 graphic display. It can be used in two ways: to display an already built histogram contained in the vector ZYY (ZNC), where ZNC is the number of channels, or to build the histogram from single events.

Total contents of histograms, average and standard deviation are calculated and displayed for the visible part of the histogram, without

considering overflow and underflow.

If you are in a hurry, all you need to do to display an histogram is :

1. define ZNC = number of bins.
2. define ZXL = low edge of lowest bin.
3. define ZST = bin width.
4. dimension DIM ZYY (ZNC + 1), the vector which will contain the histogram.
5. fill ZYY(N) with your data (ZYY(0) = underflow, ZYY(ZNC + 1) = overflow).
6. remove the REM from lines 30020 and 30030.
7. execute a GOSUB 30000.

If you want to fill a histogram, you must :

1. repeat steps 1 to 4 and step 6 from the preceding list.
2. execute a GOSUB 32500 to initialize.
3. calculate for an event ZZX = x value; ZZY = weight of the event (for a simple histogram, ZZY = 1).
4. execute a GOSUB 32600 to enter event.
5. repeat steps 3 and 4 for every event.
6. execute a GOSUB 30000 to display the histogram.

Many possibilities exist if you want to take the trouble to use them; they are :

1. give a name to the histogram :
to do this, remove \$ZNM(0) = "CANDI etc." from line 30020 and define \$ZNM(0) by yourself (max 68 characters), after dimensioning it (DIM ZNM(14)).
2. give names to axis x and y :
to do this, remove \$ZNX(0) = " " and/or \$ZNY(0) = " " from line 30030 and define them by yourself (max 30 characters), after dimensioning them (DIM ZNX(6), ZNY(6)).
3. give units to axis x and y :
to do this, remove \$ZUX = " " and/or \$ZUY = " " from line 30030 and define them by yourself (max 5 characters).
4. display statistical errors (square root of the bin contents) :
to do this, change in line 30020 ZER = 0 to ZER = 1.

5. change the style of the presentation:
to do this, change in line 30020 ZFU = 3 to:
 ZFU = 3 full rectangles
 = 2 contour of the rectangle
 = 1 dot
 = 0 nothing (but you can display the error).
6. display multiple histograms of different colors:
to do this, remove ZNH = 0 from line 30020 and define it = 0 for the first histogram, = 1 for the second, and so on. The names of the different curves, as well as the y scales, will be displayed one under the other. On the other hand, the names of the axis and the x scale will be overwritten while the bin content will remain that of the first curve. The first three histograms will not erase each other, writing on different color planes.
7. force the y scale to the limits you want:
to do this, define ZYS = 1 and ZYL = lowest y, ZYH = highest y. If you use this facility while you are filling a histogram, the display will follow on line the growth of the histogram.

The basic program CAN2HIST.TST is a test program for the histogram subroutine which must be loaded after CAN2HIST.BAS.