dstoplot

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Abstract

Plot tables in data sets using Grace.

1 Instruments/Modes

Not applicable.

2 Use

pipeline processing	no
interactive analysis	yes

3 Description

The task will convert a **dal** table into a format that can be read with the interactive plotting program Grace. The user can specify the name of the table, the name of the x column and a list of y column names. When Grace reads the output of this task it will produce a plot of the specified curves, one curve for each y column as a function of the x column. The plot is titled with the name of the set and the name of the table. The x axis is labeled with the name and units of the x column. If there is only one y column, the y axis is labeled with the name and units of this y column; if there are multiple y columns then a legend is added. The user can subsequently process the data and customize the plot using the graphical interface of Grace. The task **dsplot** conveniently combines the two steps: It generates a plot file using **dstoplot** and then automatically invokes Grace on it.

A second distinct functionality of **dstoplot** is the ability to plot abscissa data ranges as horizontal markers given as values stored in separate tables. These range markers can be plotted separately or overlaid onto a collection of plotted data curves. A practical example is to plot one or several Good-Time-Interval sets together with a time-series data set or visualize the result of a GTI-merging process (see e.g. **gtimerge**).

Please note: Only numerical and boolean columns can be plotted where in the latter case `true` translates to 1 and `false` to 0. Vector columns are supported - see description of parameter `y` for details.

On the command line the **dstoplot** task is typically applied like this:
```
dstoplot table=test.dat:some > tmp.grace && xmgrace tmp.grace
```

4 Parameters

This section documents the parameters recognized by this task (if any).

Parameter	Mand	Type	Default	Constraints
withtable	no	boolean	true	true|false

If set to true a table with numerical data column to be plotted is provided via parameter `table`

table	no	table		name of existing table

The table to be plotted in set:table notation (where set is typically a FITS file).

title	no	string		

Title for the plot - if none is given the table name shall be used.

subtitle	no	string		

Subtitle for the plot.

withx	no	boolean	false	true|false

If `true`, the user-specified x column is used for the horizontal axis. If set to `false` and `index` is likewise `false` the first numerical column in the table will be taken as the x axis.

x	no	column		name of existing column

The name of the column to be used for the x axis.

withoffsetx	no	boolean	false	true|false

If set to `true` all x values are offset by the negative of the first x data value, hence, the x-axis starts at 0. This is useful for plotting time series when the time tag values are large in magnitude.

offsetx	no	real	0.	

x-axis offset value (output).

index	no	boolean	false	true|false

Whether to use the index (0,1,2 ...) for x instead of a column.

withxmin	no	boolean	false	true|false

If true `xmin` is set.

xmin	no	real	0.	

Lower bound of x axis to show in plot.

withxmax	no	boolean	false	true|false

If true `xmax` is set.

xmax	no	real	0.	

Upper bound of x axis to show in plot.

xlog	no	boolean	false	true|false

If true x axis is produced with logarithmic scaling.

withy	no	boolean	false	true|false

If true, a curve is produced only for the y column that are specified in the `y` parameter. Otherwise all numerical columns in the table shall be plotted.

y	no	list of compound column identifiers		

A compound column identifier takes the form:

`colname|colname.errcolname|colname.errcolname.errcolname`

where `colname` can simply be the name of a numeric column in the input table or be of the form:

`colname[from,to,incr]`

which expands into the list of vectors columns starting from row `from` to row `to` in steps of `incr`. `incr` and `to` are optional. If `incr` is omitted it is taken as 1 and a missing `to` default to the value of `from`, hence, only the vector in row `from` is plotted. If a vector column is specified just by its name only the first row is considered. `errcolname` can be the name of a numeric column which will be displayed in the form of an error bar in Y- (`colname.errcolname`) or X+Y- (`colname.errcolname.errcolname`) direction. `errcolname` can also be given as a vector column with a single row specifier in square brackets.

withymin	no	boolean	false	true|false

If true `ymin` is set.

ymin	no	real	0.	

Lower bound of y axis to show in plot.

withymax	no	boolean	false	true|false

If true `ymax` is set.

ymax	no	real	0.	

Upper bound of y axis to show in plot.

ylog	no	boolean	false	true|false

If true y axis is produced with logarithmic scaling.

withscatter	no	boolean	false	true|false

If set to `true` the data is presented as a 2-D scatter plot where each data item is marked by a symbol (default `+`).

setsymbols	no	list of integers		symbol IDs in Grace

If `withscatter` is set to `true` the data points of curve i will be marked with a symbol of ID `setsymbols`[i]. See the Grace documentation for the list of available symbols IDs.

setcolors	no	list of integers		color IDs in Grace

If `withscatter` is set to `true` the data points of curve i will be marked with a symbol of color `setcolors`[i]. See the Grace documentation for the list of available color IDs.

withxranges	no	boolean	false	true|false

If set to true the parameter `xrangetables` must contain a list of tables with column data that define finite abscissa ranges that are to be displayed.

xrangetables	no	table list		list of existing tables

If `withxranges` is set to `true` this parameter must contain a list of tables with data to be plotted as horizontal abscissa data ranges. For each provided table a separate horizontal line of range markers shall be plotted - the vertical position of the lines will be `ybase`$+n\cdot$`ystride` with n ranging from 0 to $N-1$. 0 and $N-1$ corresponds to the data in the first and last table given in `xrangetables` respectively.

withalltablesafter	no	boolean	false	true|false

This parameter facilitates the plotting of a large number of abscissa range data in consecutive tables in a named data set (e.g. a sequence of Good-Time-Interval tables as generated by **hkgtigen**'s diagnostic mode). When set to `true` `xrangetables` is supposed to contain a single table name and all tables positioned after this table shall be considered as containing abscissa range data to be plotted.

xrangefromcol	no	column	START	existing column in all `xrangetables`

The name of the column in all tables given in `xrangetables` containing the values of the left boundaries of the abscissa range markers.

xrangetocol	no	column	STOP	existing column in all `xrangetables`

The name of the column in all tables given in `xrangetables` containing the values of the right boundaries of the abscissa range markers.

withybase	no	boolean	false	true|false

If set to `true` `ybase` is given.

ybase	no	real	0.	

The vertical position of the first abscissa marker line corresponding to the first table in `xrangetables`. If not explicitly given a default value based on the actual vertical extent of the plot shall be used.

withystride	no	boolean	false	true|false

If set to `true` `ystride` is given.

ystride	no	real	0.1	

The vertical distance between adjacent abscissa range marker lines in world coordinates of the plot. If not explicitly given a default value based on the actual vertical extent of the plot shall be used.

output	no	stdout—fil	stdout	

destination of output

outputfile	no	string	plot.dat	

the name of the output file if `output` is set to `file`

5 Errors

This section documents warnings and errors generated by this task (if any). Note that warnings and errors can also be generated in the SAS infrastructure libraries, in which case they would not be documented here. Refer to the index of all errors and warnings available in the HTML version of the SAS documentation.

nonNumericColumn *(error)*
A specified column is not numeric or boolean.

IndexOutOfBounds *(error)*
Specified row number (on vector columns) is greater than number of table rows

IllegalDataVectorSpecifier *(error)*
Syntax error in data vector specifier

MultidimensionalColumn *(error)*
A specified column has a higher dimension than two - only scalar and one-dimensional vector columns are supported.

NoNumericColumns *(error)*
The specified table does not contain a numeric or boolean data column that can be plotted.

NoAbscissaRangeTable *(error)*
`withalltablesafter` is set to `true` but no inital table is given in `xrangetables`.

IndexOutOfRange *(error)*
This signals an internal error - please report this as an SPR

InvalidRowRangeSpecifier *(error)*
Non-numeric argument in row-range specifier for vector columns seen, e.g. `COL[start,stop]`

openFile *(error)*
Could not create Grace parameter file.

6 Input Files

1. a data set with numerical columns

7 Output Files

1. an ASCII file containing commands and data for Grace

8 Algorithm

```
open the table
if not withx
    numeric column for x
if not withy
    use other numeric columns for y
write commands for the title of the plot and labels of the x axis
for each y column
    if one y axis
        write commands for y axis labels
    else
        write commands for the legend
    for each row
        write x[i], y[i]
    end
end
```

9 Comments

- The user can customize the plot in the following ways:
  - interactively using the Grace graphical user interface
  - using a file containing Grace commands, that is loaded after the **dstoplot** output (e.g. `dstoplot set=test.dat | xmgrace -source stdin -param myconfig.grace`)
  - using a parameter file that has been produced by 'Save parameters' in a previous session of Grace (e.g. `dstoplot set=test.dat | xmgrace -source stdin -param myconfig.param`)

  See the Grace manual for further instructions.
- The batch version of Grace, called `gracebat`, can be used to produce plots without user interaction. E.g.:
  `dstoplot set=test.dat | gracebat -eps -printfile test.ps -noask -source stdin`
  or alternatively
  `dstoplot set=test.dat plotter="gracebat -eps -printfile test.ps -noask"`
- Grace is the successor of `xmgr` which is no further developed or maintained.

References