Chapter 940

Scatter Plots

Introduction

This section describes the options that are available for the appearance of a scatter plot. A set of all these options can be stored as a template file which can be retrieved later.

X and Y Axis Tabs

These options specify the characteristics of the lines, labels, and tick marks along the X and Y axes.

Boundaries

These boundaries set the minimum and maximum of the plot. Data values outside these boundaries are ignored. When set, these boundaries override any other boundaries.

Minimum

This is the smallest value of the axis. If left blank, a nice value is determined from the data.

Maximum

This is the largest value of the axis. If left blank, a nice value is determined from the data.

Corners

Click to bring up a window that lets you extend the axis a little further. This is usually done so that the X and Y tick mark labels are not too close together or so that data points do not fall directly on the axis line. The value is the number of pixels the axis end is shifted.

Note that this does not change scale of the graph. It only shifts the location of the axis.

Scale

Linear

Selects a linear scale in which the plot distant between equally-spaced points along the axis is constant. For example, the distance on the plot between 10 and 20 is the same as that between 80 and 90.

Log

Selects a logarithmic scale in which the plot distant between equally-spaced points along the axis increases. For example, the distance on the plot between 1 and 10 is the same as that between 100 and 1000.

- **Base**

    This is the base of the logarithms. Possible choices are integers between 2 and 16. A common choice is 10.

    Here are some examples of tick patterns resulting from various bases.

    Base = 2: 1, 2, 4, 8, 16, 32, 64, 128, etc.

    Base = 3: 1, 3, 9, 27, 81, 243, 729, etc.

Base = 5: 1, 5, 25, 125, 625, etc.

Base = 8: 1, 8, 64, 512, 4096, etc.

Base = 10: 1, 10, 100, 1000, etc.

- **Format**

    This option specifies the format of the tick reference numbers.

    Choose *Numbers* to display the tick values as integers (e.g., 1, 10, 100, 1000).

    Choose *Powers* to display the tick values as exponential numbers (e.g., 10^0, 10^1, 10^2, 10^3).

Axis Labels

These options specify the characteristics of the axis label.

Top, Bottom or Left, Right

These options indicate whether the label is to be shown along the top and/or bottom (left and/or right) axes.

Text

Enter the label text here.

Text replacement codes can be used to create labels that will be changed at runtime. These codes are replaced by appropriate text (such as variable names) when a plot is generated. The codes are

{X} is replaced by the name of the X axis variable.

{Y} is replaced by the name of the Y axis variable.

Font

The font size, color, and style of the label may be modified by pressing the font button (A) to the right of the text.

Layout

The exact position of the text is set by pressing the layout button (Layout) to the right of the font button.

The text is printed inside of an imaginary box of appropriate size. The Layout window sets the alignment, the margins, and the shift of the text.

The **alignment** designates whether the text is centered, right-justified, or left-justified within the box.

The **margin** indicates the number of pixels displayed above and below the text.

The **shift** indicates the number of pixels that the text is shifted in the X and/or Y directions. This is used to make small adjustments to the text placement.

Lines

These options specify the characteristics of the axis lines. Note that the axis lines can be specified separately from the axis boundaries.

Top, Bottom or Left, Right

These options indicate whether a line is displayed for the top and/or bottom (left and/or right) axes.

Line Format Button

Pressing this button displays the Axis Line Format window that sets the format (color, width, and pattern) of the axis line. Click the left side of the button to load the Line Format window. Click the right side of the button to select a format from various preset line formats.

Crosses X (or Y) Axis at

Specifies the point at which this axis crosses the opposite axis.

- **{blank}**

The axis is placed at the edge of the plot region.

- **Numeric Value**

The axis is placed at this value of the opposite axis. For example, if the X axis has both positive and negative values, you might want to enter '0' here for the Y axis so that it crosses the X axis at 0.

Axis Line Min and Max

These values are used to set a specific minimum and maximum for the axis line. When entered, the axis line is only visible in that region. Note that other axis objects such as the tick marks and tick reference labels might extend beyond the end of the visible axis line.

Possible choices are

- **{blank}**

The axis line is extended to the edge of the axis.

- **Value**

The axis line is extended to the specified value.

- **Data**

If *Data* is entered, the axis line is extended to the exact minimum (or maximum) of the data.

Major Ticks

These options specify the characteristics of the major (primary) ticks, including their placement and format.

Top Marks, Bottom Marks or Left Marks, Right Marks

These options indicate whether major tick marks are displayed along the top and/or bottom (left and/or right) axes.

Format

Clicking this button allows the color, size, and position of the tick marks to be set.

Tick Number and Spacing

Clicking this button allows the number and spacing of the ticks to be set.

Top Labels, Bottom Labels or Left Labels, Right Labels

These options indicate whether the tick reference labels are displayed at the corresponding ticks.

Font

Pressing the font button (A) lets the font size, color, and style of the tick reference label to be modified.

Layout

The exact position of the tick reference labels are set by pressing the layout button (Layout).The labels are displayed inside an imaginary box. The Layout window sets the alignment, rotation angle, margins, and shift of the reference labels.

The **alignment** designates whether the reference labels are centered, right-justified, or left-justified within the box.

The **rotation angle** designates whether the reference labels are rotated through a specified angle.

The **margin** indicates the number of pixels displayed above and below the reference labels.

The **shift** indicates the number of pixels that the reference labels are shifted in the X and/or Y directions. This is used to make small adjustments to the text placement.

Decimals

Specify the number of decimal places displayed in the tick label.

- **Auto**

If *Auto* is selected, the number of decimal places is determined from the data values.

Minor Ticks

These options specify the characteristics of the minor ticks, including their placement and format. Note that no reference labels are available for minor ticks.

Top Marks, Bottom Marks or Left Marks, Right Marks

These options indicate whether minor tick marks are displayed along the top and/or bottom (left and/or right) axes.

Format

Clicking this button allows the color, size, and position of the minor tick marks to be set.

Tick Number and Spacing

Clicking this button allows the number and spacing of the minor ticks to be set.

Grid Line Tab

These options specify the characteristics of various grid lines the X and Y axes.

From X Axis

These grid lines extend vertically from the X axis.

At Major Ticks

Check this option to extend grid lines vertically from the major ticks along the X axis. The check box is followed by a Line Format button that sets the characteristics of the line.

At Minor Ticks

Check this option to extend grid lines vertically from the minor ticks along the X axis. The check box is followed by a Line Format button that sets the characteristics of the line.

At These Values

Check this option to extend grid lines vertically from the minor ticks at the values in the list. The check box is followed by a text box in which the values are entered. The text box is followed by a Line Format button that sets the characteristics of the line.

- **List**

You can enter a list separated by blanks such as

10 20 25 30 40

- **Range**

You can enter a range of values using the *xxx TO yyy BY zzz* syntax such as

10 to 100 by 10

The value list is followed by a Line Format button that sets the characteristics of the line.

From Y Axis

These grid lines extend horizontally from the Y axis.

At Major Ticks

Check this option to extend grid lines horizontally from the major ticks along the Y axis. The check box is followed by a Line Format button that sets the characteristics of the line.

At Minor Ticks

Check this option to extend grid lines horizontally from the minor ticks along the Y axis. The check box is followed by a Line Format button that sets the characteristics of the line.

At These Values

Check this option to extend grid lines horizontally from the minor ticks at the values in the list. The check box is followed by a text box in which the values are entered. The text box is followed by a Line Format button that sets the characteristics of the line.

- **List**

You can enter a list separated by blanks such as

10 20 25 30 40

- **Range**

You can enter a range of values using the *xxx TO yyy BY zzz* syntax such as

10 to 100 by 10

The value list is followed by a Line Format button that sets the characteristics of the line.

Symbols Tab

These options specify the characteristics of the symbols used for plotting.

Symbols 1 - 100

These buttons display the Symbol window that lets you edit the settings of the symbol associated with a specific group. Click the left side of the button to bring up the symbol window. Click the right side of the button to choose from a list of preset, favorite, or recent symbols.

Note that group 1 is used when no grouping variable is selected.

Using the symbol window, you can choose the shape, size, color, transparency, and border of the symbol.

Shapes

There are many different symbol shapes, including circles, rectangles, triangles, stars, and arrows. You can also choose a character as a shape from among the many thousand characters that Windows has available. You can even type a short phrase.

Fill

The color of the symbol's interior can be a solid color or multi-colored gradient pattern.

Size

The size is set as a percentage of the default size.

Border Width

Set the width of the symbol's border in pixels.

Border Color

Set the symbol's border color.

Other Options

Show Symbols

Uncheck this option to hide all symbols. Check it to display the symbols.

Change All

Check this option to change the size, border width, or transparency of all 100 symbols to a specified value.

Titles Tab

These options set the titles of the plot. Up to two titles may be specified on each of the four sides of the plot.

Titles along the X Axes

These options specify the characteristics of the title displayed at the top or bottom of the plot.

Top 1, Top 2, Bottom 1, or Bottom 2

These options indicate whether the title is shown along the top and/or bottom of the plot.

Text

Enter the title text here.

Text replacement codes can be used to create labels that will be changed at runtime. These codes are replaced by appropriate text (such as variable names) when a plot is generated. The codes are

{T} by the program generated plot title.

{X} is replaced by the name of the X axis variable.

{Y} is replaced by the name of the Y axis variable.

{G} by the grouping variable's name.

{Z} by the third variable's name.

{A} by the intercept.

{B} by the slope.

{R} by the R squared value.

For example, you would enter

{Y} = {A} + ({B}){X}

to display the linear regression equation.

Font (A)

The font size, color, and style of the title may be modified by pressing the font button (A) to the right of the text.

Layout

The exact position of the text is set by pressing the layout button (Layout) to the right of the font button.

The text is printed inside of an imaginary box of appropriate size. The Layout window sets the alignment, the margins, and the shift of the text.

The **alignment** designates whether the text is centered, right-justified, or left-justified within the box.

The **margin** indicates the number of pixels displayed above and below the text.

The **shift** indicates the number of pixels that the text is shifted in the X and/or Y directions. This is used to make small adjustments to the text placement.

Titles along the Y Axes

These options specify the characteristics of the title displayed at the left or right of the plot. The details are identical to those for the X Axes (above).

Legend Tab

These options display the characteristics and position to the plot legend.

General Tab

This tab displays options about the location, title, and appearance of the box containing the legion.

Show Legend

This check box specifies whether to display the legend.

Show Legend If

This setting indicates if the legend is displayed when there is only one group.

Margin Outside the Legend Frame

These options specify the margins around the edges of the legend.

Titles

These options specify one or two titles for the legend.

Frame and Fill

These options set the properties of the legend's frame (outline) and its fill (interior color).

Layout Tab

This tab displays options about the layout (arrangement) of the entries within the legend.

Arrangement

These options control the number of columns in the legend and the direction in which the legend entries are displayed.

Margins Inside the Legend

These options control the margins between the various portions of the legend.

Spacing

These options control the margins (space) between the entries

Legend Entry Order

These options control order in which the entries are shown.

Groups Tab

This tab displays options about the display of the grouping variable in the legend.

Group Labels

These options control the format of the text portion of the entry for each group.

Group Symbols

These options control the format of the symbol portion of the entry for each group.

Customize Individual Legend Entries

These options let you change the format and position of specific groups in the legend.

Connect Tab

This tab displays options about the display of the connecting lines in the legend.

Connecting Line Labels

These options control the format of the text portion of the entry for each connecting line.

Connecting Line Size

These options control the format of the line portion of the entry for each connecting line.

Customize Individual Legend Entries

These options let you change the format and position of specific connecting lines in the legend. They also let you generate separate legend entries for each trend line and group combination.

Extra Lines Tab

This tab displays options about the display of the extra lines in the legend.

Extra Line Labels

These options control the format of the text portion of the entry for each extra line.

Extra Line Size

These options control the format of the line portion of the entry for each extra line.

Customize Individual Legend Entries

These options let you change the format and position of specific extra lines in the legend.

Extra Symbols Tab

This tab displays options about the display of the extra symbols in the legend.

Extra Symbol Labels

These options control the format of the text portion of the entry for each extra symbol.

Extra Symbol Size

These options control the format of the symbol portion of the entry for each extra symbol.

Customize Individual Legend Entries

These options let you change the format and position of specific extra symbols in the legend.

Connect Tab

These options control the characteristics of connecting lines that can be added to the plot.

Point Connecting Line

This option draws a line connecting each point. One line is drawn per group.

Connection Order

The points may be connected in different orders.

- **Row Order**

The points are connected in the order in which the points appear on the database.

- **Left to Right**

The points are connected in the order of their X values.

- **Bottom to Top**

The points are connected in the order of their Y values.

Extras Tab

The options on this tab let you add extra lines, symbols, and notes to the plot.

Extra Lines

This option lets you add an unlimited number of extra lines to a plot. To add a line, specify a line format and the beginning and ending points of the line.

Extra Symbols

This option lets you add an unlimited number of extra symbols to a plot. To add a symbol, specify a symbol format and the point where the symbol is to be displayed.

Notes

This option lets you add an unlimited number of notes (text) to a plot. To add a phrase, specify the text, its format, and the beginning location on the plot.

Points-to-Axis Tab

The options on this tab let you to add display tick marks, lines, or bars at each data point.

Tick Marks for each Data Point

These options let you display a tick mark along the axis for each data point.

Lines from each Data Point

These options let you display a line from each data point to the designated axis.

Bars from each Data Point

These options let you display a bar from each data point to the designated axis.

Colors and Size Tab

These options specify a background color for the whole plot (background) and for the data region (interior). They also specify size and margins of the plot.

Background

This option specifies the background outline and fill color.

Interior

This option specifies the interior fill color. This is the color of the portion of the plot on which the data points are plotted.

Size

This option specifies the width and height (in pixels) of the interior area of the plot. The legend, border plots, tick marks, titles, and labels are added to the outside of this area. Thus, the total width and height of the plot cannot be specified.

Margin

This option a margin for each edge of the plot (in pixels).

Painting Order Tab

The options under this tab control the order in which items are placed on the plot. Items at the top of the list are placed on the plot first. They may be obscured the items that are plotted later.

Example Data Tab

Usually, you will set up the format of a scatter plot before the data are available. This option lets you see how your options appear on a set of random data.

You control the number of groups, number of data points, and the data limits of both the X and Y variable.

Pressing the *New Data* button generates a new set of random data.