region_options — Options for shading and outlining regions and controlling graph size

Syntax

region_options

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ysize(#)</td>
</tr>
<tr>
<td>height of available area (in inches)</td>
</tr>
<tr>
<td>xsize(#)</td>
</tr>
<tr>
<td>width of available area (in inches)</td>
</tr>
<tr>
<td>graphregion(suboptions)</td>
</tr>
<tr>
<td>attributes of graph region</td>
</tr>
<tr>
<td>plotregion(suboptions)</td>
</tr>
<tr>
<td>attributes of plot region</td>
</tr>
</tbody>
</table>

Options ysize() and xsize() are unique; options graphregion() and plotregion() are merged-implicit; see [G-4] concept: repeated options.

suboptions

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>style(areastyle)</td>
</tr>
<tr>
<td>overall style of outer region</td>
</tr>
<tr>
<td>color(colorstyle)</td>
</tr>
<tr>
<td>line and fill color of outer region</td>
</tr>
<tr>
<td>fcolor(colorstyle)</td>
</tr>
<tr>
<td>fill color of outer region</td>
</tr>
<tr>
<td>lstyle(linestyle)</td>
</tr>
<tr>
<td>overall style of outline</td>
</tr>
<tr>
<td>lcolor(colorstyle)</td>
</tr>
<tr>
<td>color of outline</td>
</tr>
<tr>
<td>lwidth(linewidthstyle)</td>
</tr>
<tr>
<td>thickness of outline</td>
</tr>
<tr>
<td>lpattern(linepatternstyle)</td>
</tr>
<tr>
<td>outline pattern (solid, dashed, etc.)</td>
</tr>
<tr>
<td>istyle(areastyle)</td>
</tr>
<tr>
<td>overall style of inner region</td>
</tr>
<tr>
<td>icolor(colorstyle)</td>
</tr>
<tr>
<td>line and fill color of inner region</td>
</tr>
<tr>
<td>icolor(colorstyle)</td>
</tr>
<tr>
<td>fill color of inner region</td>
</tr>
<tr>
<td>llstyle(linestyle)</td>
</tr>
<tr>
<td>overall style of outline</td>
</tr>
<tr>
<td>ilcolor(colorstyle)</td>
</tr>
<tr>
<td>color of outline</td>
</tr>
<tr>
<td>ilwidth(linewidthstyle)</td>
</tr>
<tr>
<td>thickness of outline</td>
</tr>
<tr>
<td>ilpattern(linepatternstyle)</td>
</tr>
<tr>
<td>outline pattern (solid, dashed, etc.)</td>
</tr>
<tr>
<td>margin(marginstyle)</td>
</tr>
<tr>
<td>margin between inner and outer regions</td>
</tr>
</tbody>
</table>

The available area, graph region, and plot region are defined.

- **available area:** The area in which the graph appears.
- **graph region:** The area outside the borders of the outer plot region.
- **plot region:** The area inside the borders of the outer plot region.

**Description**

The `region_options` set the size, margins, and color of the area in which the graph appears.

**Options**

- `ysize(#)` and `xsize(#)` specify in inches the height and width of the available area. The defaults are usually `ysize(4)` and `xsize(5.5)`, but this, of course, is controlled by the scheme; see [G-4] schemes intro. These two options can be used to control the overall aspect ratio of a graph. See Controlling the aspect ratio below.

- `graphregion(suboptions)` and `plotregion(suboptions)` specify attributes for the graph region and plot region.

**Suboptions**

- `style(areastyle)` and `istyle(areastyle)` specify the overall style of the outer and inner regions.
- `color(colorstyle)` and `icolor(colorstyle)` specify the color of the line used to outline the outer and inner regions; see [G-4] colorstyle for a list of choices.
- `fcolor(colorstyle)` and `ifcolor(colorstyle)` specify the fill color for the outer and inner regions; see [G-4] colorstyle for a list of choices.
\texttt{lstyle(linestyle)} and \texttt{ilstyle(linestyle)} specify the overall style of the line used to outline the outer and inner regions, which includes its pattern (solid, dashed, etc.), thickness, and color. The other suboptions listed below allow you to change the line’s attributes individually, but \texttt{lstyle()} and \texttt{ilstyle()} are the starting points. See \cite{G-4} \texttt{linestyle} for a list of choices.

\texttt{lcolor(colorstyle)} and \texttt{ilcolor(colorstyle)} specify the color of the line used to outline the outer and inner regions; see \cite{G-4} \texttt{colorstyle} for a list of choices.

\texttt{lwidth(linewidthstyle)} and \texttt{ilwidth(linewidthstyle)} specify the thickness of the line used to outline the outer and inner regions; see \cite{G-4} \texttt{linewidthstyle} for a list of choices.

\texttt{lpattern(linepatternstyle)} and \texttt{ilpattern(linepatternstyle)} specify whether the line used to outline the outer and inner regions is solid, dashed, etc.; see \cite{G-4} \texttt{linepatternstyle} for a list of choices.

\texttt{margin(marginstyle)} specifies the margin between the outer and inner regions; see \cite{G-4} \texttt{marginstyle}.

Remarks and examples

Remarks are presented under the following headings:

- Setting the offset between the axes and the plot region
- Controlling the aspect ratio
- Suppressing the border around the plot region
- Setting background and fill colors
- How graphs are constructed

Setting the offset between the axes and the plot region

By default, most schemes (see \cite{G-4} \texttt{schemes intro}) offset the axes from the region in which the data are plotted. This offset is specified by \texttt{plotregion(margin(marginstyle))}; see \cite{G-4} \texttt{marginstyle}.

If you do not want the axes offset from the contents of the plot, specify \texttt{plotregion(margin(zero))}. Compare the next two graphs:

\begin{verbatim}
. use http://www.stata-press.com/data/r13/auto
(1978 Automobile Data)
. scatter price mpg
\end{verbatim}

\begin{verbatim}
. use http://www.stata-press.com/data/r13/auto
(1978 Automobile Data)
. scatter price mpg
\end{verbatim}
Controlling the aspect ratio

Here we discuss controlling the overall aspect ratio of a graph. To control the aspect ratio of a plot region for `twoway`, `graph bar`, `graph box`, or `graph dot`, see `[G-3] aspect_option.`

The way to control the aspect ratio of the overall graph is by specifying the `xsize()` or `ysize()` options. For instance, you draw a graph and find that the graph is too wide given its height. To address the problem, either increase `ysize()` or decrease `xsize()`. The usual defaults (which of course are determined by the scheme; see `[G-4] schemes intro`) are `ysize(4)` and `xsize(5.5)`, so you might try

```
. graph ..., ... ysize(5)
```

or

```
. graph ..., ... xsize(4.5)
```

For instance, compare

```
. scatter mpg weight
```

```
. scatter price mpg, plotr(m(zero))
```
. scatter mpg weight, ysize(5)
Another way to control the aspect ratio is to add to the outer margin of the *graph area*. This will keep the overall size of the graph the same while using less of the *available area*. For instance,

```
. scatter mpg weight, graphregion(margin(l+10 r+10))
```

This method is especially useful when using *graph*, *by()*; but remember to specify the *graphregion(margin())* option inside the *by()* so that it affects the entire graph:

```
. scatter mpg weight, by(foreign, total graphr(m(l+10 r+10)))
```
Compare the above with

. scatter mpg weight, by(foreign, total)

A similar, and often preferable, effect can be obtained by constraining the aspect ratio of the plot region itself; see [G-3] aspect_option.

You do not have to get the aspect ratio or size right the first time you draw a graph; using graph display, you can change the aspect ratio of an already drawn graph—even a graph saved in a .gph file. See Changing the size and aspect ratio in [G-2] graph display.

### Suppressing the border around the plot region

To eliminate the border around the plot region, specify plotregion(style(none)):

. use http://www.stata-press.com/data/r13/auto, clear
   (1978 Automobile Data)
   . scatter mpg weight, plotregion(style(none))
Setting background and fill colors

The background color of a graph is determined by default by the scheme you choose—see [G-4] schemes intro—and is usually black or white, perhaps with a tint. Option graphregion(fcolor(colorstyle)) allows you to override the scheme’s selection. When doing this, choose a light background color for schemes that are naturally white and a dark background color for schemes that are naturally black, or you will have to type many options to make your graph look good.

Below we draw a graph, using a teal background:

```
. use http://www.stata-press.com/data/r13/auto, clear
(1978 Automobile Data)
. scatter mpg weight, graphregion(fcolor(teal))
```

![Graph with teal background](image)

See [G-4] colorstyle for information on what you may specify inside the graphregion(fcolor()) option.

In addition to graphregion(fcolor()), there are three other fill-color options:

- `graphregion(ifcolor())` fills inner graph region ←of little use
- `plotregion(fcolor())` fills outer plot region ←useful
- `plotregion(ifcolor())` fills inner plot region ←could be useful

plotregion(fcolor()) is worth remembering. Below we make the plot region teal:
. scatter mpg weight, plotr(fcolor(teal))

The other two options—`graphregion(ifcolor())` and `plotregion(ifcolor())`—fill the inner graph region and inner plot region. Filling the inner graph region serves little purpose. Filling the inner plot region—which is the same as the outer plot region except that it omits the margin between the inner plot region and the axes—generally makes graphs appear too busy.

How graphs are constructed

`graph` works from the outside in, with the result that the dimensions of the plot region are what are left over.

`graph` begins with the available area, the size of which is determined by the `xsize()` and `ysize()` options. `graph` indents on all four sides by `graphregion(margin())`, so it defines the outer border of the graph region, the interior of which is the inner graph region.

Overall titles (if any) are now placed on the graph, and on each of the four sides, those titles are allocated whatever space they require. Next are placed any axis titles and labels, and they too are allocated whatever space necessary. That then determines the outer border of the plot region (or, more properly, the border of the outer plot region).

The axis (if any) is placed right on top of that border. `graph` now indents on all four sides by `plotregion(margin())`, and that determines the inner border of the plot region, meaning the border of the inner plot region. It is inside this that the data are plotted.

An implication of the above is that, if `plotregion(margin(zero))`, the axes are not offset from the region in which the data are plotted.

Now consider the lines used to outline the regions and the fill colors used to shade their interiors.

Starting once again with the available area, `graph` outlines its borders by using `graphregion(lstyle())`—which is usually `graphregion(lstyle(none))”—and fills the area with the graphregion(fcolor()).

`graph` now moves to the inner border of the graph region, outlines it using `graphregion(ilstyle())`, and fills the graph region with `graphregion(ifcolor())`.

`graph` moves to the outer border of the plot region, outlines it using `plotregion(lstyle())`, and fills the outer plot region with `plotregion(fcolor())`.
Finally, graph moves to the inner border of the *plot region*, outlines it using `plotregion(ilstyle())`, and fills the (*inner*) *plot region* with `plotregion(ifcolor())`.

**Also see**

[G-4] *areastyle* — Choices for look of regions

[G-4] *colorstyle* — Choices for color

[G-4] *linepatternstyle* — Choices for whether lines are solid, dashed, etc.

[G-4] *linestyle* — Choices for overall look of lines

[G-4] *linewidthstyle* — Choices for thickness of lines

[G-4] *marginstyle* — Choices for size of margins