

MATLAB Function Reference

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axis

Axis scaling and appearance

Syntax

```
axis([xmin xmax ymin ymax])
axis([xmin xmax ymin ymax zmin zmax cmin cmax])
v = axis
axis auto
axis manual
axis tight
axis fill
axis ij
axis xy
axis equal
axis image
axis square
axis vis3d
axis normal
axis off
axis on
axis(axes_handles,...)
[mode,visibility,direction] = axis('state')
```

Description

`axis` manipulates commonly used axes properties. (See Algorithm section.)

`axis([xmin xmax ymin ymax])` sets the limits for the x- and y-axis of the current axes.

`axis([xmin xmax ymin ymax zmin zmax cmin cmax])` sets the x-, y-, and z-axis limits and the color scaling limits (see [caxis](#)) of the current axes.

`v = axis` returns a row vector containing scaling factors for the x-, y-, and z-axis. `v` has four or six components depending on whether the current axes is 2-D or 3-D, respectively. The returned values are the current axes `XLim`, `Ylim`, and `ZLim` properties.

`axis auto` sets MATLAB[®] default behavior to compute the current axes limits automatically, based on the minimum and maximum values of x, y, and z data. You can restrict this automatic behavior to a specific axis. For example, `axis 'auto x'` computes only the x-axis limits automatically; `axis 'auto yz'` computes the y- and z-axis limits automatically.

`axis manual` and `axis(axis)` freezes the scaling at the current limits, so that if `hold` is on, subsequent plots use the same limits. This sets the `XLimMode`, `YLimMode`, and `ZLimMode` properties to `manual`.

`axis tight` sets the axis limits to the range of the data.

`axis fill` sets the axis limits and `PlotBoxAspectRatio` so that the axes fill the position rectangle. This option has an effect only if `PlotBoxAspectRatioMode` or `DataAspectRatioMode` is `manual`.

`axis ij` places the coordinate system origin in the upper left corner. The i -axis is vertical, with values increasing from top to bottom. The j -axis is horizontal with values increasing from left to right.

`axis xy` draws the graph in the default Cartesian axes format with the coordinate system origin in the lower left corner. The x -axis is horizontal with values increasing from left to right. The y -axis is vertical with values increasing from bottom to top.

`axis equal` sets the aspect ratio so that the data units are the same in every direction. The aspect ratio of the x -, y -, and z -axis is adjusted automatically according to the range of data units in the x , y , and z directions.

`axis image` is the same as `axis equal` except that the plot box fits tightly around the data.

`axis square` makes the current axes region square (or cubed when three-dimensional). This option adjusts the x -axis, y -axis, and z -axis so that they have equal lengths and adjusts the increments between data units accordingly.

`axis vis3d` freezes aspect ratio properties to enable rotation of 3-D objects and overrides stretch-to-fill.

`axis normal` automatically adjusts the aspect ratio of the axes and the relative scaling of the data units so that the plot fits the figure's shape as well as possible.

`axis off` turns off all axis lines, tick marks, and labels.

`axis on` turns on all axis lines, tick marks, and labels.

`axis(axes_handles,...)` applies the `axis` command to the specified axes. For example, the following statements

```
h1 = subplot(221);  
h2 = subplot(222);  
axis([h1 h2], 'square')
```

set both axes to square.

`[mode,visibility,direction] = axis('state')` returns three strings indicating the current setting of axes properties:

Output Argument	Strings Returned
mode	'auto' 'manual'
visibility	'on' 'off'
direction	'xy' 'ij'

mode is auto if `XLimMode`, `YLimMode`, and `ZLimMode` are all set to auto. If `XLimMode`, `YLimMode`, or `ZLimMode` is manual, mode is manual.

Keywords to `axis` can be combined, separated by a space (e.g., `axis tight equal`). These are evaluated from left to right, so subsequent keywords can overwrite properties set by prior ones.

Remarks

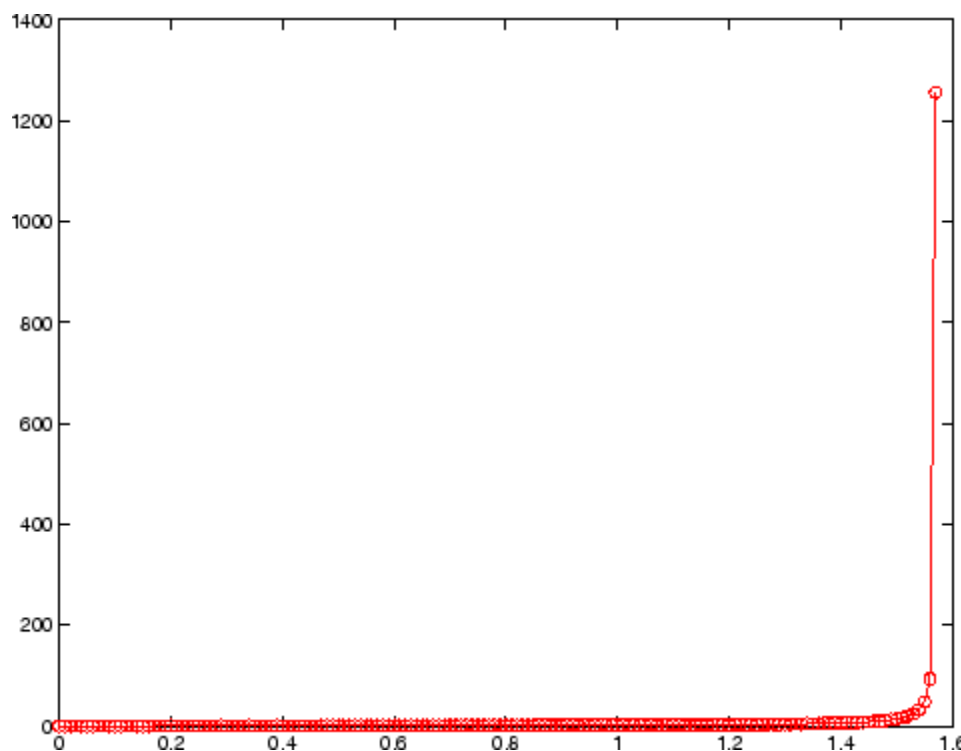
You can create an axes (and a figure for it) if none exists with the `axis` command. However, if you specify non-default limits or formatting for the axes when doing this, such as `[4 8 2 9]`, `square`, `equal`, or `image`, the property is ignored because there are no axis limits to adjust in the absence of plotted data. To use `axis` in this manner, you can set `hold on` to keep preset axes limits from being overridden.

Examples

The statements

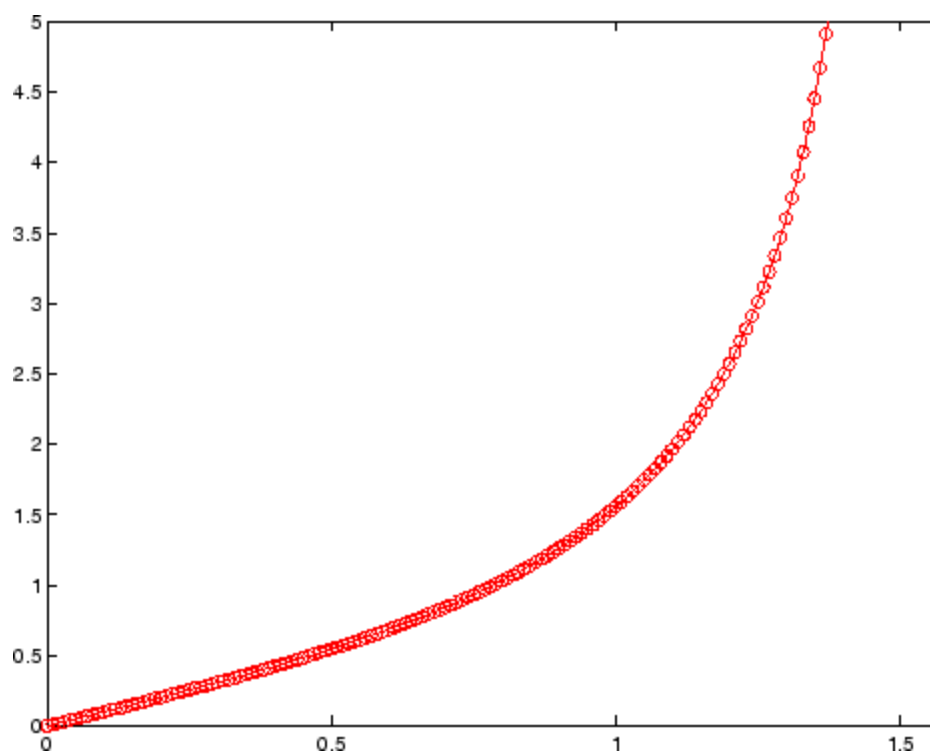
```
x = 0:.025:pi/2;  
plot(x,tan(x),'-ro')
```

use the automatic scaling of the y-axis based on `ymax = tan(1.57)`, which is well over 1000:



The right figure shows a more satisfactory plot after typing

```
axis([0 pi/2 0 5])
```



Algorithm

When you specify minimum and maximum values for the x-, y-, and z-axes, `axis` sets the `XLim`, `Ylim`, and `ZLim` properties for the current axes to the respective minimum and maximum values in the argument list. Additionally, the `XLimMode`, `YLimMode`, and `ZLimMode` properties for the current axes are set to `manual`.

`axis auto` sets the current axes `XLimMode`, `YLimMode`, and `ZLimMode` properties to `'auto'`.

`axis manual` sets the current axes `XLimMode`, `YLimMode`, and `ZLimMode` properties to `'manual'`.

The following table shows the values of the axes properties set by `axis equal`, `axis normal`, `axis square`, and `axis image`.

Axes Property or Behavior	<code>axis equal</code>	<code>axis normal</code>	<code>axis square</code>	<code>axis image</code>
<code>DataAspectRatio</code> property	<code>[1 1 1]</code>	not set	not set	<code>[1 1 1]</code>
<code>DataAspectRatioMode</code> property	<code>manual</code>	<code>auto</code>	<code>auto</code>	<code>manual</code>
<code>PlotBoxAspectRatio</code> property	<code>[3 4 4]</code>	not set	<code>[1 1 1]</code>	<code>auto</code>
<code>PlotBoxAspectRatioMode</code> property	<code>manual</code>	<code>auto</code>	<code>manual</code>	<code>auto</code>
See Also				
<code>Stretch-to-fill</code> behavior:	disabled	active	disabled	disabled


[axes](#), [grid](#), [subplot](#), [xlim](#), [ylim](#), [zlim](#)

Properties of axes graphics objects

[Axes Operations](#) for related functions

For aspect ratio behavior, see in the axes properties reference page.

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 Axes Properties

balance 

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