



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 to its default behavior of computing 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). MATLAB 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
<code>mode</code>	'auto' 'manual'
<code>visibility</code>	'on' 'off'
<code>direction</code>	'xy' 'ij'

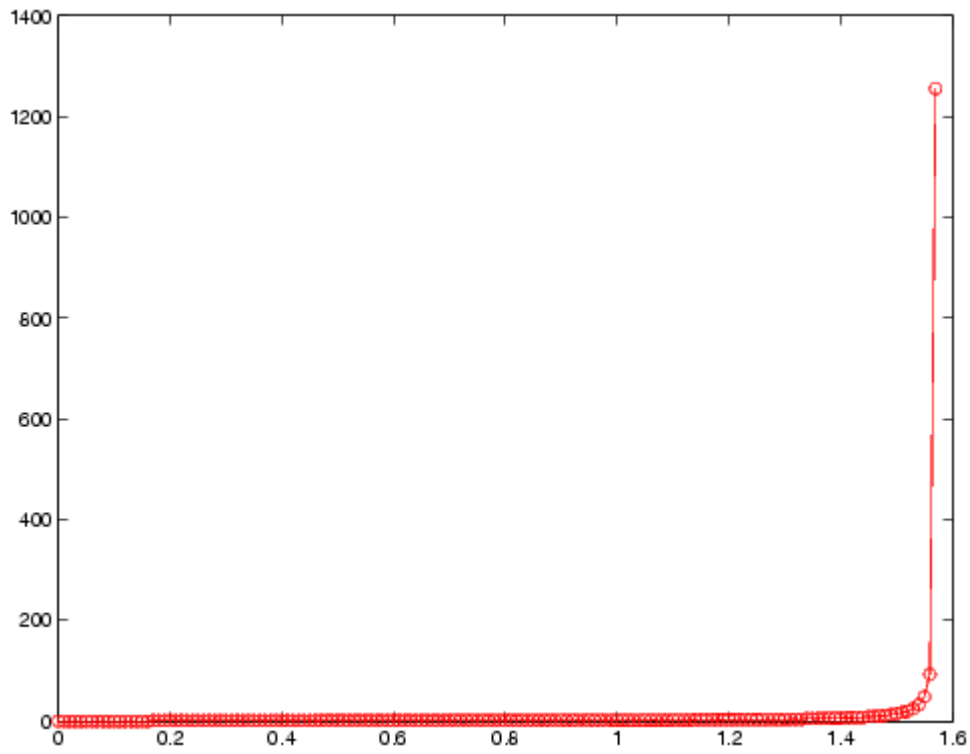
`mode` is `auto` if `XLimMode`, `YLimMode`, and `ZLimMode` are all set to `auto`. If `XLimMode`, `YLimMode`, or `ZLimMode` is `manual`, `mode` is `manual`.

Examples

The statements

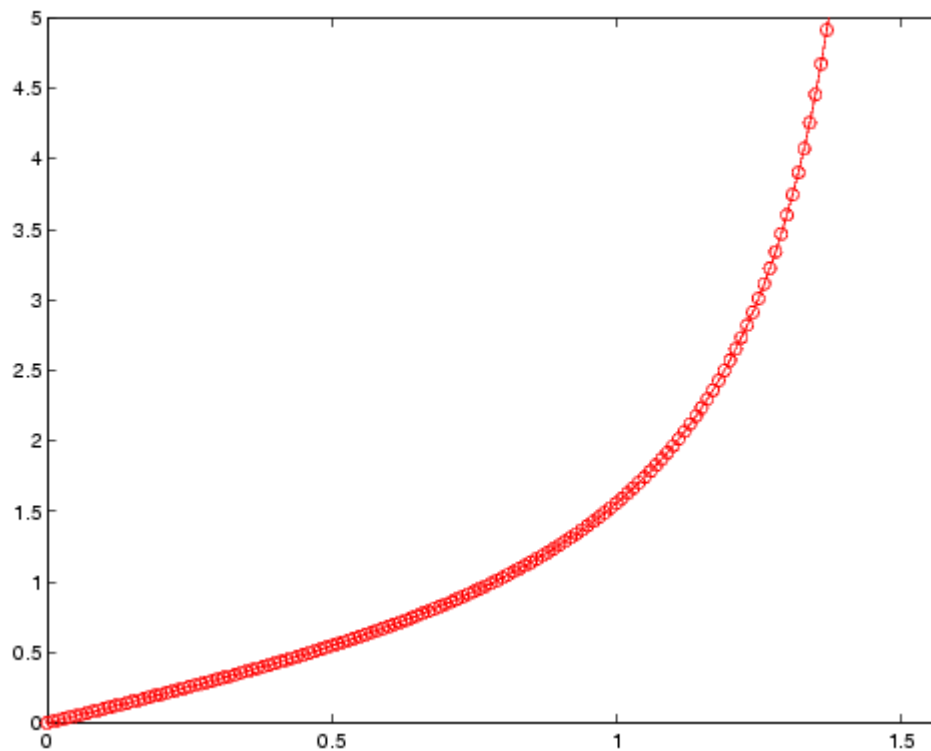
```
x = 0:.025:pi/2;  
plot(x,tan(x),'-ro')
```

use the automatic scaling of the y-axis based on $y_{\max} = \tan(1.57)$, 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	<code>axis equal</code>	<code>axis normal</code>	<code>axis square</code>	<code>axis tightequal</code>
<code>DataAspectRatio</code>	[1 1 1]	not set	not set	[1 1 1]
<code>DataAspectRatioMode</code>	manual	auto	auto	manual
<code>PlotBoxAspectRatio</code>	[3 4 4]	not set	[1 1 1]	auto
<code>PlotBoxAspectRatioMode</code>	manual	auto	manual	auto
<code>Stretch-to-fill</code>	disabled	active	disabled	disabled

See Also

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

Properties of [axes](#) graphics objects

[Axes Operations](#) for related functions

◀ Axes Properties

balance ▶

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