

## NumberLine

INHERITS FROM

View : Responder : Object

DECLARED IN

NumberLine.h

### CLASS DESCRIPTION

A NumberLine is a View that displays a mathematical number line. The number line will be horizontal if the view is wider than it is high, or vertical if the view is higher than it is wide. Tick marks, and labels for every fifth tick mark, are calculated and displayed automatically. The labels can be placed either above or below (for a horizontal line) or on the left or the right (for a

vertical line) of the line itself.

## INSTANCE VARIABLES

*Inherited from Object*

Class

isa;

*Inherited from Responder*

id

nextResponder;

*Inherited from View*

CGRect

frame;

CGRect

bounds;

id superview;

id subviews;

id window;

struct \_\_vFlags

vFlags;

*Declared in NumberLine*

int

orientation;

int labelPosition;

float

linePosition;

float

backgroundGray;

float

lineGray;

```

float
float
struct __tickInfo {
    float
    float
    int
    float
    float
    int
    char
    char
    BOOL
} tickInfo;

id numberLineImage;

labelGray;
borderWidth;

firstTick;
tickSpacing;
numberOfTicks;
firstLabel;
labelSpacing;
numberOfLabels;
labelString[11][30];
expString[11][5];
scientific;

```

orientation

Whether the number line is drawn horizontally or vertically.

labelPosition

On which side of the number line the labels should be drawn.

linePosition	The position, within the view, where the line is drawn.
backgroundGray	The gray value for the background of the View.
lineGray	The gray value for the number line and tick marks.
labelGray	The gray value for the labels.
borderWidth	Width of the border, or -1 if there is no border.
tickInfo.firstTick	The value at the leftmost or bottommost tick mark.
tickInfo.tickSpacing	The distance between tick marks.
tickInfo.numberOfTicks	The total number of tick marks.
tickInfo.firstLabel	The value at the leftmost or bottommost labelled tick mark.
tickInfo.labelSpacing	The distance between labelled tick marks.
tickInfo.numberOfLabels	The number of labelled tick marks.
tickInfo.labelString	Array of formatted labels or label mantissas.

tickInfo.expString

Array of exponents of ten to be used for scientific notation.

tickInfo.scientific

Whether scientific notation is used for the labels.

numberLineImage

The NXImage used for drawing the number line.

## METHOD TYPES

Initializing a new NumberLine object - initFrame:

Modifying graphics attributes

- setBackgroundGray:
- setLineGray:
- setLabelGray:
- orientation
- setLinePosition:
- linePosition:
- setLabelPosition:
- labelPosition:

Moving and scaling the number line

- setBordered:width:
- setMin:max:
- min
- max
- zoomIn:
- zoomOut:
- setCenter:
- center
- slide:

Drawing the NumberLine

- drawSelf::
- drawIntoImage
- calculateTicks
- numberLineNXImage

INSTANCE METHODS

## **calculateTicks**

### **- calculateTicks**

Calculates the tick marks and labels for the current number line. This method updates all the values of the structure *tickInfo*. It doesn't do any drawing into either the *numberLineNXImage* or the View. This method is invoked whenever the bounds change. You will not need to invoke it yourself.

## **center**

### **- (float)center**

Returns the current center point of the number line.

See also: - **setCenter**, - **setMin:max:**

## **drawIntoImage**

### **- drawIntoImage**

Draws the number line, with tick marks and labels, into the *numberLineNXImage*. This method is invoked whenever the *numberLineNXImage* needs updating. You will not need to

invoke it yourself.

### **drawSelf::**

- **drawSelf:**(const NXRect \*)*rects* :(int)*rectCount*

Composites the contents of *numberLineNXImage* onto the NumberLine.

### **initFrame:**

- **initFrame:**(const NXRect \*)*frameRect*

Initializes a new NumberLine object. The number line will display the range -10 to 10 and will be set at *linePosition* 30. If *frameRect.size.height* is greater than *frameRect.size.width*, the number line will be vertical; otherwise, it will be horizontal. Labels will be below a horizontal number line or to the left of a vertical one.

### **labelPosition**

- (float)**labelPosition**

Returns one of the constants BELOWLEFT or ABOVERIGHT to indicate the position where the



tick mark labels will be drawn. The default is below a horizontal number line or to the left of a vertical number line.

See also: - **setLabelPosition:**

### **linePosition**

- (float)**linePosition**

Returns the position, in default coordinates, at which the number line will be drawn within the view. The position is measured from the bottom in case of a horizontal number line and from the right in case of a vertical number line. The default position is 30.

See also: - **setLinePosition:**

### **max**

- (float)**max**

Returns the current rightmost or topmost endpoint of the number line. Redraws only if autodisplay is on. Returns **self**.

See also: - **min**, - **setMin:max:**, - **setCenter:**, - **slide:**, - **zoomIn:**, - **zoomOut:**

## **min**

- (float)**min**

Returns the current leftmost or bottommost endpoint of the number line. Redraws only if autodisplay is on. Returns **self**.

See also: - **max**, - **setMin:max:**, - **setCenter:**, - **slide:**, - **zoomIn:**, - **zoomOut:**

## **numberLineNXImage**

- **numberLineNXImage**

Returns the NXImage containing the drawing of the number line. This allows, with autodisplay off, other objects to do their own compositing in order to increase drawing speed. Returns **self**.

See also: - **setAutodisplay:** (View)

## **orientation**

- (int)**orientation**

Returns one of the constants HORIZONTAL or VERTICAL, indicating whether the number line is horizontal or vertical. It will be VERTICAL if and only if the NumberLine is taller than it is wide.

**setBackgroundGray:**

- **setBackgroundGray:**(float)*gray*

Sets the background gray for the NumberLine. The background will be transparent, and the default gray is NX\_WHITE. Does not redraw. Returns **self**.

**setBordered:width:**

- **setBordered:**(BOOL)*shouldHaveBorder* **width:**(float)*width*

Indicates whether or not a black border should be drawn around the NumberLine and, if so, its width in unscaled (default) coordinates. If *shouldHaveBorder* is NO, *width* will be ignored. Does not redraw. Returns **self**.

**setCenter:**

- **setCenter:**(float)*newCenter*

Sends a **setMin:max:** message to itself to translate the number line to make *newCenter* the center point. Redraws only if autodisplay is on. Returns **self**.

See also: - **center**, - **slide:**, - **setMin:max:**

**setLabelGray:**

- **setLabelGray:**(float)*gray*

Sets the gray value for drawing the tick mark labels. The default is NX\_BLACK. Does not redraw. Returns **self**.

**setLabelPosition:**

- **setLinePosition:**(float)*newPosition*

Sets the position where the tick mark labels will be drawn. The constant BELOWLEFT will cause them to be drawn below a horizontal number line or to the left of a vertical one, while ABOVERIGHT will cause them to be drawn above a horizontal number line or to the right of a

vertical one. The position is measured in unscaled (default) coordinates. Does not redraw. Returns **self**.

See also: - **labelPosition**

### **setLineGray:**

- **setLineGray:**(float)*gray*

Sets the gray value for drawing the number line and the tick marks. The default is NX\_BLACK. Does not redraw. Returns **self**.

### **setLinePosition:**

- **setLinePosition:**(float)*newPosition*

Sets the position, measured in unscaled (default) coordinates, at which the number line will be drawn within the NumberLine. The position is measured from the bottom of the NumberLine if the number line is horizontal and from the right edge if it is vertical. Does not redraw. Returns **self**.

See also: - **linePosition**

**setMin:max:**

- **setMin:**(float)*newMin* **max:**(float)*newMax*

Resets the left (or bottom) and right (or top) endpoints of the number line. Redraws only if autodisplay is on. Returns **self**.

See also: - **min**, - **max**, - **setCenter:**, - **slide:**, - **zoomIn:**, - **zoomOut:**

**slide:**

- **slide:**(float)*translation*

Sends a **setMin:max:** message to itself to translate the number line by *translation* units in the positive direction. A negative value for *translation* thus causes a translation in the negative direction. Redraws only if autodisplay is on. Returns **self**.

See also: - **setCenter:**, - **setMin:max:**

**zoomIn:**

- **zoomIn:**(float)*amount*

Sends a **setMin:max:** message to itself to reduce the range of values displayed on the number line by a factor of *amount*. The center point remains the same. Redraws only if `autodisplay` is on. Returns **self**.

See also: - **setMin:max:**, - **zoomOut:**

#### **zoomOut:**

- **zoomOut:**(float)*amount*

Sends a **setMin:max:** message to itself to increase the range of values displayed on the number line by a factor of *amount*. The center point remains the same. Redraws only if `autodisplay` is on. Returns **self**.

See also: - **setMin:max:**, - **zoomIn:**