WebGraphLib library

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subject to alterations

Changes history

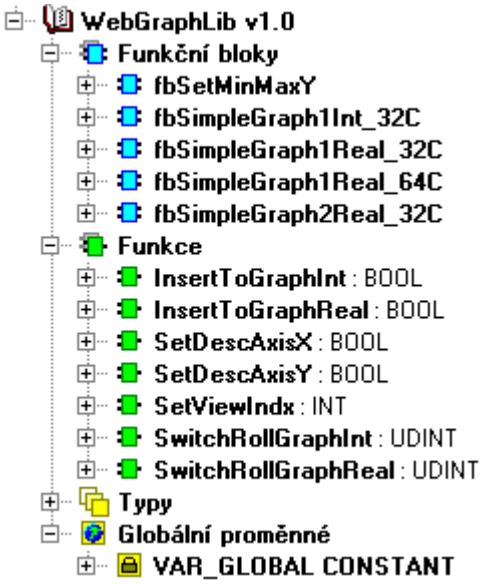
Date	Edition	Change description
March 2010	1	First edition, description correnspponds to WebGraphLib_v10

CONTENT

1 INTRODUCTION

Library WebGraphLib is standardly supplied as a part of programmable environment Mosaic. The library contains functions and function blocks supporting the display of simple graphs on the web page created by a WebMaker tool.

Following picture shows the structure of the WebGraphLib library in the Mosaic environment

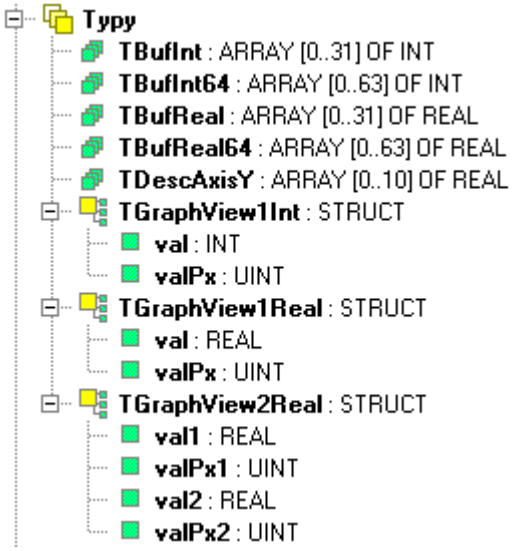


If we want to use functions from the WebGraphLib library within the aplication program of the PLC, it is firstly neccessary to add this library into the project. The library is supplied as a part of the Mosaic installation from version v2.0.23. The object „column controlled by variable“ is used for the display of the graph which is supported by the WebMaker tool from Mosaic version v2.0.22.

The WebGraphLib library does not require any special support from the firmware of the processor PLC module. The display of graphs in the web browser is conditioned by a web server in the central module. It is a part of the firmware of central units of the K rank (TC700 CP-7004, všechny varianty systému Foxtrot). Recommended version of FW is v5.0 or higher.

2 DATA TYPES

In the WebGraphLib library there are defined following data types:



Data type	***Description***
TBufInt	Array of 32 elements of the INT type
TBufInt64	Array of 64 elements of the INT type
TBufReal	Array of 32 elements of the REAL type
TBufReal64	Array of 64 elements of the REAL type
TDescAxisY	Array of 11 elements of the REAL type used for the description of an Y axis in the graph
TGraphView1Int	The structure used for one value of the INT type gived to the graph. It contains the item *val* with the variable value and the item *valPx* where the correspondent size of the column block is in pixels.
TGraphView1Real	The structure used for one value of the REAL type gived to the graph. It contains the item *val* with the variable value and the item *valPx* where the correspondent size of the column block is in pixels.
TGraphView2Real	The structure used for two values of the REAL type gived to the graph. It contains the item *val1* and *val2* with the variable value and the item *valPx1* and *valPx2* where the correspondent size of the column block is in pixels.

3 CONSTANTS

In the WebGraphLib library the following constants are defined:

The constant NULL_PTR is used for initialization of variables of the type PTR_TO in case when pointer does not show any variable.

Identifier	*Type*	*Value*	*Signification*
NULL_PTR	UDINT	16#FFFF_FFFF	Invalid pointer

4 GLOBAL VARIABLES

In the WebGraphLib library there are no global variables defined.

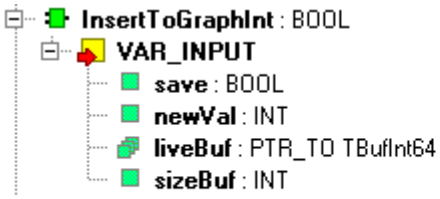
5 FUNCTIONS

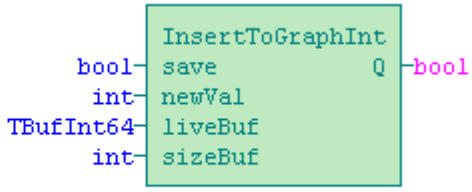
The WebGraphLib library contains following functions:

Function	***Description***
InsertToGraphInt	Insert the value of the INT type into the array of values displayed in the graph
InsertToGraphReal	Insert the value of the REAL type into the array of values displayed in the graph
SetDescAxisX	Sets description of axis X for graph. *SetDescAxisX* is an internal function that is used by function blocks from the library WebGraphLib.
SetDescAxisY	Sets description of axis Y for graph. *SetDescAxisY* is an internal function that is used by function blocks from the library WebGraphLib.
SetViewIndx	Set the index to the value array, where values will be in the graph displayed from. *SetViewIndx* is an internal function that is used by function blocks from the library WebGraphLib.
SwitchRollGraphInt	Switch the graph between the status when it is rolled automatically at the moment of a new value entry and the status when it is possible to view within the graph all values entered up to that moment. The function is desined for graphs operating with values of INT type.
SwitchRollGraphReal	Switch the graph between the status when it is automatically rolled at the moment of a new value entry and the status when it is possible to view within the graph all values entered up to that moment. The function is desined for graphs operating with values of REAL type.

5.1 Function InsertToGraphInt

Library: *WebGraphLib*





Function *InsertToGraphInt* saves the value of input variable *newVal* into value array that is displayed in the graph. The new value is saved at the end of the array if the variable *save* has the TRUE value. Before saving the new value the content of the array is moved one sample backwards so the oldest item in the array is dropped out (the first item of the array). The array address is entered in the variable *liveBuf*, the nuber of elements is set by the variable *sizeBuf*. The array must have items of INT type.

The function is designated for graphs operating with values of INT type (see for example function block *fbSimpleGraph1Int_32C)*.

Variable description :

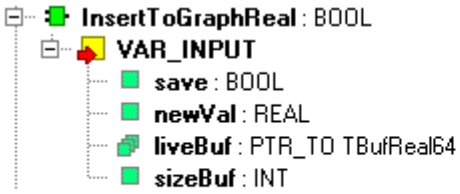
	Variable	*Type*	*Signification*
VAR_INPUT			
	save	BOOL	If it is TRUE, the function moves the array content of one item backwards and saves the value *newVal* at the end of the array. If it is FALSE, function does not perform any action.
	newVal	INT	New value that should be saved into the value array
	liveBuf	PTR_TO INT	Array address where the new value is saved at the end
	sizeBuf	INT	Array size (item number)
InsertToGraphInt			
	Release value	BOOL	When new value is saved, it returnes TRUE, otherwise, FALSE

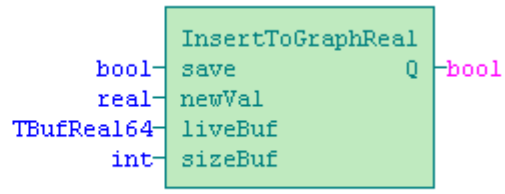
The example of the program with the *InsertToGraphInt* function call is described in the chapter 6.3 Function block fbSimpleGraph1Real_64C.

Further see also Function InsertToGraphReal

5.2 Function InsertToGraphReal

Library : *WebGraphLib*





Function *InsertToGraphReal* saves the value into the input variable *newVal* into the value array that is displayed in the graph. The new value is saved at the end of the array if the variable *save* has the TRUE value. Before saving the new value the content of the array is moved one sample backwards so the oldest item in the array is dropped out (the first item of the array). The array address is entered in the variable *liveBuf*, the nuber of elements is set by the variable *sizeBuf*. The array must have items of REAL type.

The function is designated for graphs operating with values of REAL type (see for example function blocks *fbSimpleGraph1Real_32C*, *fbSimpleGraph1Real_64C* and *fbSimpleGraph2Real_32C).*

Variable description :

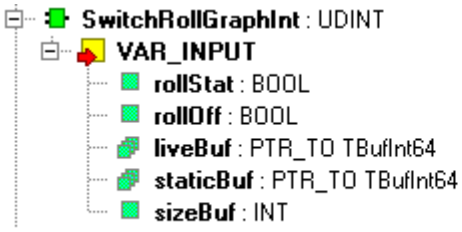
	Variable	*Type*	*Signification*
VAR_INPUT			
	save	BOOL	If it is TRUE, the function moves the array content of one item backwards and saves the value *newVal* at the end of the array. If it is FALSE, function does not perform any action.
	newVal	REAL	New value that should be saved into the value array
	liveBuf	PTR_TO REAL	Array address where the new value is saved at the end
	sizeBuf	INT	Array size (item number)
InsertToGraphReal			
	Release value	BOOL	When new value is saved, it returnes TRUE, otherwise, FALSE

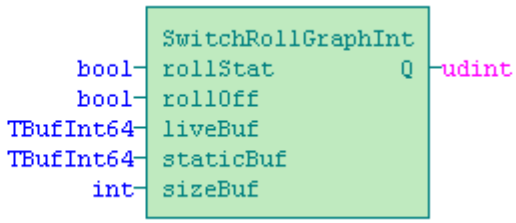
The example of the program with the *InsertToGraphReal* function call is described in the chapter 6.3 Function block fbSimpleGraph1Real_64C

Further see also Function InsertToGraphInt

5.3 Function SwitchRollGraphInt

Library : *WebGraphLib*





Function *SwitchRollGraphInt* governs the switch on and off of the graph roll for one axis. If hte input variable *rollStat* has the value TRUE the function returns the address that gets from the variable *liveBuf*. It is the address of the array where new value samples are saved to (e.g. By function *InsertToGraphInt*). As new samples are saved, the displayed values in the graph will move down – the graph will roll with every new value. If the input variable *rollStat* has the value FALSE the function returns address that gets from the variable *staticBuf*. It is the address of the array where the function *SwitchRollGraphInt* will copy all values from the array *liveBuf* at the moment when the graph roll is switched off which indicates the input variable *rollOff*. If the graph roll is switched off, it is then possible to view saved values without the influence of new entry on the graph display.

The function is designated for all graphs operationg with values of INT type (see for example of function block *fbSimpleGraph1Int_32C)*.

Variables description :

	Variable	*Type*	*Signification*
VAR_INPUT			
	rollStat	BOOL	If it is TRUE, the graph roll is switched on, if it is FALSE, the graph roll is switched off (see the homonyc output of function block *fbSimpleGraph1Int_32C*)
	rollOff	BOOL	TRUE for the time of one cycle during the graph roll is switched off (see the homonyc output of function block *fbSimpleGraph1Int_32C*)
	liveBuf	PTR_TO INT	Array address where values for the graph are saved (e.g. function *InsertToGraphInt*)
	staticBuf	PTR_TO INT	Array address where the array *liveBuf* is coppied in case of graph roll switch off
	sizeBuf	INT	Size of value array for the graph (number of items)
SwitchRollGraphInt			
	Release value	UDINT	If the input variable *rollStat* is TRUE, it returns value *liveBuf*, otherwise, value *staticBuf*

The example of the program with the function *SwitchRollGraphInt* call is described in the chapter 6.3 Function block fbSimpleGraph1Real_64C.

Further see also Function InsertToGraphInt, Function block fbSimpleGraph1Int_32C

5.4 Function SwitchRollGraphReal

Library : *WebGraphLib*

Function *SwitchRollGraphReal* governs the switch on and off of the graph roll for one axis. If the input variable *rollStat* has the value TRUE the function returns the address that gets from the variable *liveBuf*. It is the address of the array where new value samples are saved to (e.g. by function *InsertToGraphInt*). As new samples are saved, the displayed values in the graph will move down – the graph will roll with every new value. If the input variable *rollStat* has the value FALSE the function returns address that gets from the variable *staticBuf*. It is the address of the array where the function *SwitchRollGraphReal* will copy all values from the array *liveBuf* at the moment when the graph roll is switched off which indicates the input variable *rollOff*. If the graph roll is switched off, it is then possible to view saved values without the influence of new entry on the graph display.

The function is designated for all graphs operating with values of REAL type (see for example function blocks *fbSimpleGraph1Real_32C*, *fbSimpleGraph1Real_64C* and *fbSimpleGraph2Real_32C).*

Variable description:

	Variable	*Type*	*Signification*
VAR_INPUT			
	rollStat	BOOL	If it is TRUE, the graph roll is switched on, if it is FALSE, the graph roll is switched off (see the homonyc output of function block *fbSimpleGraph1Real_32C*)
	rollOff	BOOL	TRUE for the time of one cycle during the graph roll is switched off (see the homonyc output of function block *fbSimpleGraph1Real_32C*)
	liveBuf	PTR_TO INT	Array address where values for the graph are saved (e.g. function *InsertToGraphReal*)
	staticBuf	PTR_TO INT	Array address where the array *liveBuf* is coppied in case of graph roll switch off
	sizeBuf	INT	Size of value array for the graph (number of items)
SwitchRollGraphReal			
	Release value	UDINT	*If the input variable rollStat is TRUE, it returns value liveBuf, otherwise, value staticBuf*

The example of the program with the function *SwitchRollGraphReal* call is described in the chapter 6.3 Function block fbSimpleGraph1Real_64C

Further see also Function InsertToGraphInt, Function block fbSimpleGraph1Int_32C

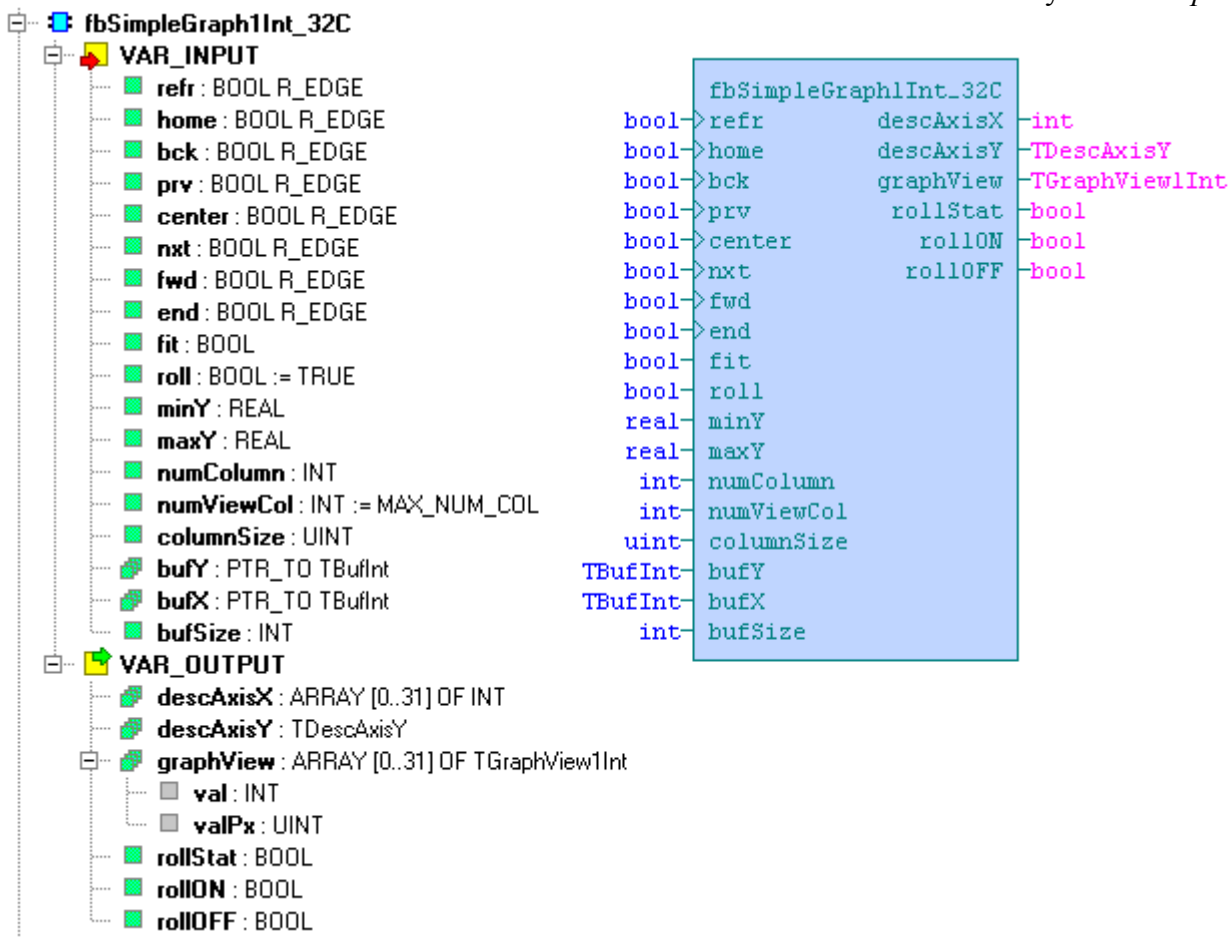
6 FUNCTION BLOCKS

In the library WebGraphLib there are folliwing function block defined:

Function block	***Description***
fbSetMinMaxY	Finds min and max value displayed in the graph. *fbSetMinMaxY* is an internal function block that is used by other function blocks from the library WebGraphLib.
fbSimpleGraph1Int_32C	Support for graph of one variable of the INT type Max number of displayed samples is 32
fbSimpleGraph1Real_32C	Support for graph of one variable of the REAL type Max number of displayed samples is 32
fbSimpleGraph1Real_64C	Support for graph of one variable of the REAL type Max number of displayed samples is 64
fbSimpleGraph2Real_32C	Support for graph of one variable of the REAL type Max number of displayed samples is 32 for each variable

6.1 Function block fbSimpleGraph1Int_32C

Library : *WebGraphLib*



Function block *fbSimpleGraph1Int_32C* is used as a support for the graph of one variable of the INT type. Maximum number of displayed samples is 32.

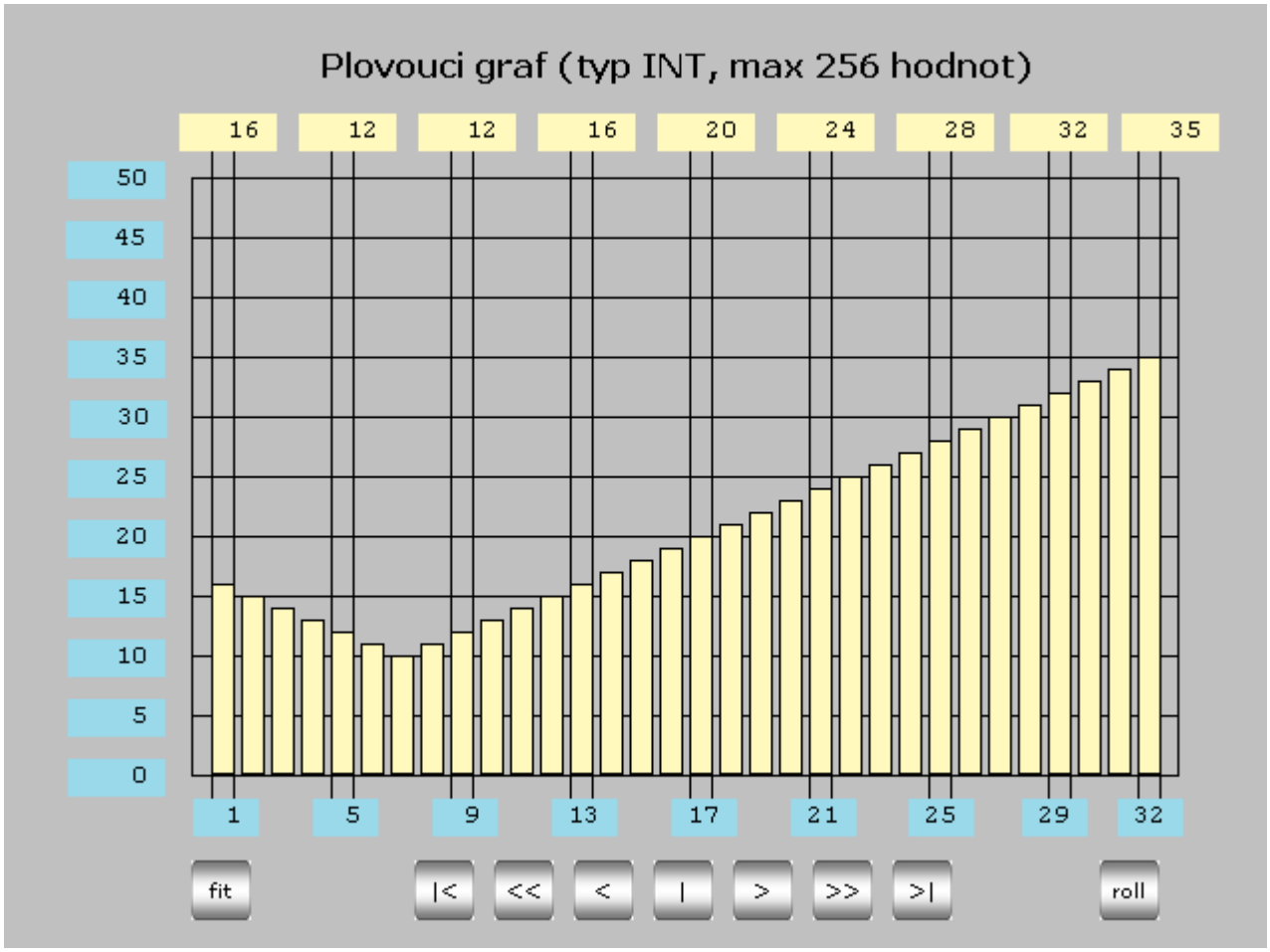
Variable description :

	Variable	*Type*	*Signification*
VAR_INPUT			
	refr	BOOL R_EDGE	Entering edge on this input causes the re-count of input variables for the graph
	home	BOOL R_EDGE	Graph control from the web page Graph displays 32 values before the array beginning
	bck	BOOL R_EDGE	Graph control from the web page Graph shift 16 values to the array beginning
	prv	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array beginning
	center	BOOL R_EDGE	Graph control from the web page

	Variable	*Type*	*Signification*
			Graph displays 32 values in the array center
	nxt	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array end
	fwd	BOOL R_EDGE	Graph control from the web page Graph shift 16 values to the array end
	end	BOOL R_EDGE	Graph control from the web page Graph displays 32 values before the array end
	fit	BOOL	Graph control from the web page TRUE sets the range of axis Y according to actual mi-nimum and maximum value displayed in the graph, FALSE sets the range of axis Y according to input variables *minY* a *maxY*
	roll	BOOL	Graph control from the web page TRUE switch on the graph roll, FALSE switch off graph roll
	minY	REAL	Min value on the axis Y
	maxY	REAL	Max value on the axis Y
	numColumn	INT	Number of graph columns on the web page (max. 32)
	numViewCol	INT	Number of actually displayed columns of the graph (max. 32)
	columnSize	UINT	Max size of one column of the graph in pixels
	bufY	PTR_TO INT	Address of array of values that will be displayed on the axis Y. The array must be of the type ARRAY[] OF INT.
	bufX	PTR_TO INT	Address of array of values that will be displayed on the axis X. The array must be of the type ARRAY[] OF INT.
	bufSize	INT	Number of item of the array that is displayed in the graph
VAR_OUTPUT			
	descAxisX	ARRAY OF INT	Axis X description for the graph
	descAxisY	TDescAxisY	Axis Y description for the graph
	graphView	ARRAY OF TGraphView1Int	Values displayed in the graph together with the size of columns in pixels
	rollStat	BOOL	Status of input *roll*

	Variable	*Type*	*Signification*
	rollON	BOOL	TRUE if the status of input roll changes from FALSE to TRUE, otherwise, FALSE
	rollOFF	BOOL	TRUE if the status of input roll changes from TRUE to FALSE, otherwise, FALSE

Following example demonstrates the display of variagle which value linearly oscillates within the interval <10, 40> (saw progress). Web page for the graph can appear, for example, as follows:



Control buttons on the web page are bounded onto input variables of the function block of the graph. Button „fit“ controls the variable *SawCurve.graphSample.fit*, button „roll“ controls the variable *SawCurve.graphSample.roll*, etc. Max number of values that can be viewed in the graph is 256 (see the constant *NUM_SAMPLES*).

The example of the program with the function block *fbSimpleGraph1Int_32C* :

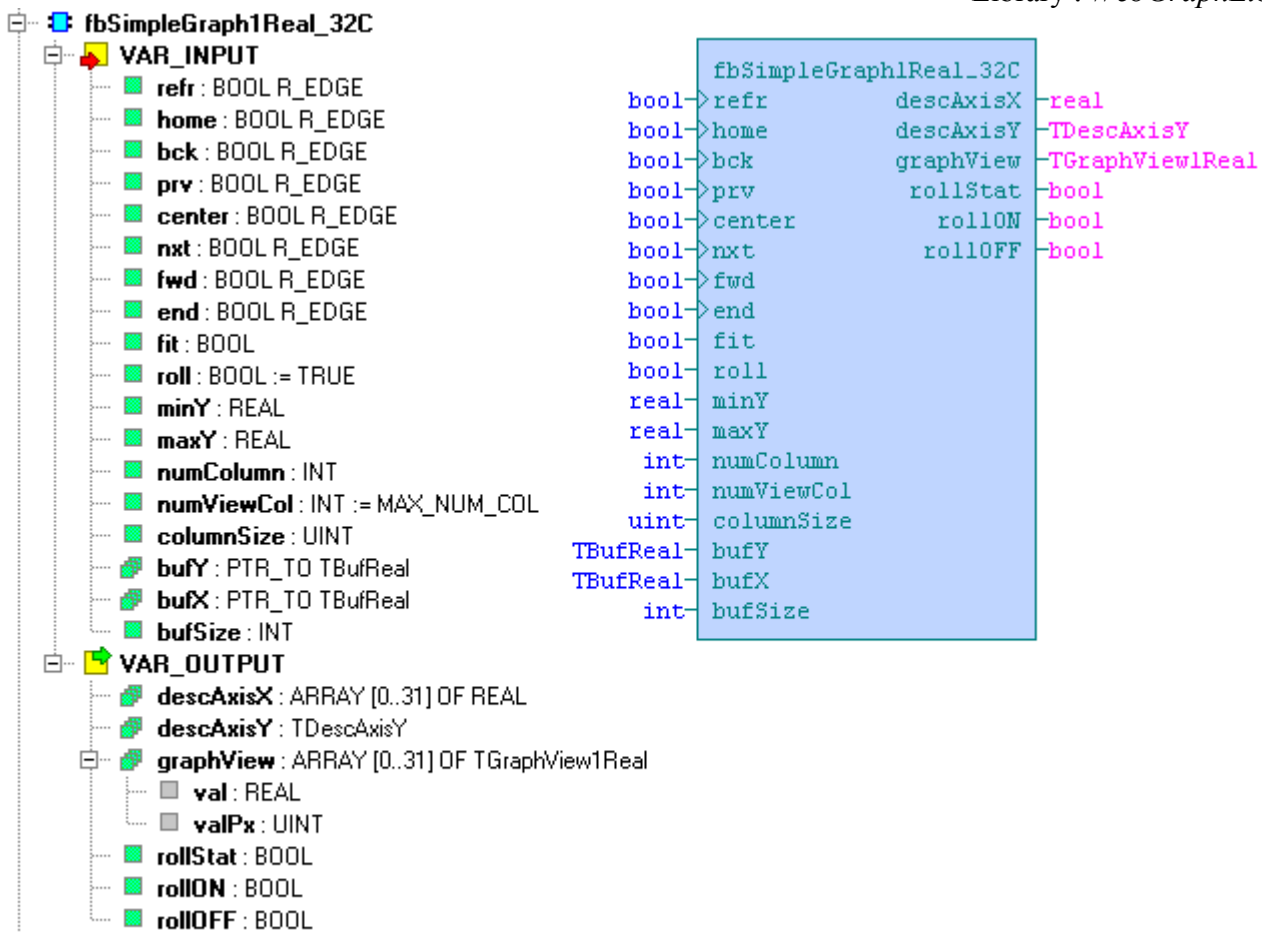
```
PROGRAM prgSawCurve
  VAR CONSTANT
    NUM_SAMPLES : INT := 256;
  END_VAR
```

```
  VAR
    // buffer pro ulozeni hodnot, ktere budou zobrazeny v grafu
    sampleBuf      : ARRAY[0..NUM_SAMPLES-1] OF INT;
    // pomocny buffer pro prohlizeni grafu
    sampleBufCopy  : ARRAY[0..NUM_SAMPLES-1] OF INT;
    // funkcni blok grafu
    graphSample    : fbSimpleGraph1Int_32C;

    refresh        : BOOL;             // prekresleni grafu
    data           : UDINT;            // adresa pole hodnot pro graf
    sample         : INT;              // aktualni vzorek
    upFlg          : BOOL;
  END_VAR
  VAR_EXTERNAL
    AT %S20.0      : BOOL;             // casova zakladna pro ukladani vzorku
  END_VAR

  // simulace piloveho prubehu pro graf
  IF %S20.0 THEN
    IF upFlg THEN
      IF sample < 40 THEN sample := sample + 1;
                     ELSE sample := sample - 1; upFlg := 0;
      END_IF;
    ELSE
      IF sample > 10 THEN sample := sample - 1;
                     ELSE sample := sample + 1; upFlg := 1;
      END_IF;
    END_IF;
  END_IF;

  // ukladani vzorku dat do bufferu, ktery je zobrazen jako graf
  refresh :=  InsertToGraphInt( save    := %S20.0,
                                newVal  := sample,
                                liveBuf := ADR(sampleBuf),
                                bufSize := NUM_SAMPLES);

  // osetrit zapnuti / vypnuti rolovani grafu
  data := SwitchRollGraphInt( rollStat  := graphSample.rollStat,
                              rollOff   := graphSample.rollOFF,
                              liveBuf   := ADR(sampleBuf),
                              staticBuf := ADR(sampleBufCopy),
                              bufSize   := NUM_SAMPLES);

  // spocitat hodnoty pro graf
  graphSample( refr := refresh,
               minY       := 0.0,
               maxY       := 50.0,
               numColumn  := 32,
               numViewCol := 32,
               columnSize := 300,
               bufY       := UDINT_TO_PTR( data),
               bufX       := NULL_PTR,
               bufSize    := NUM_SAMPLES);
END_PROGRAM
```

See also Function InsertToGraphInt, Function SwitchRollGraphInt

6.2 Function blocck fbSimpleGraph1Real_32C

Library : *WebGraphLib*



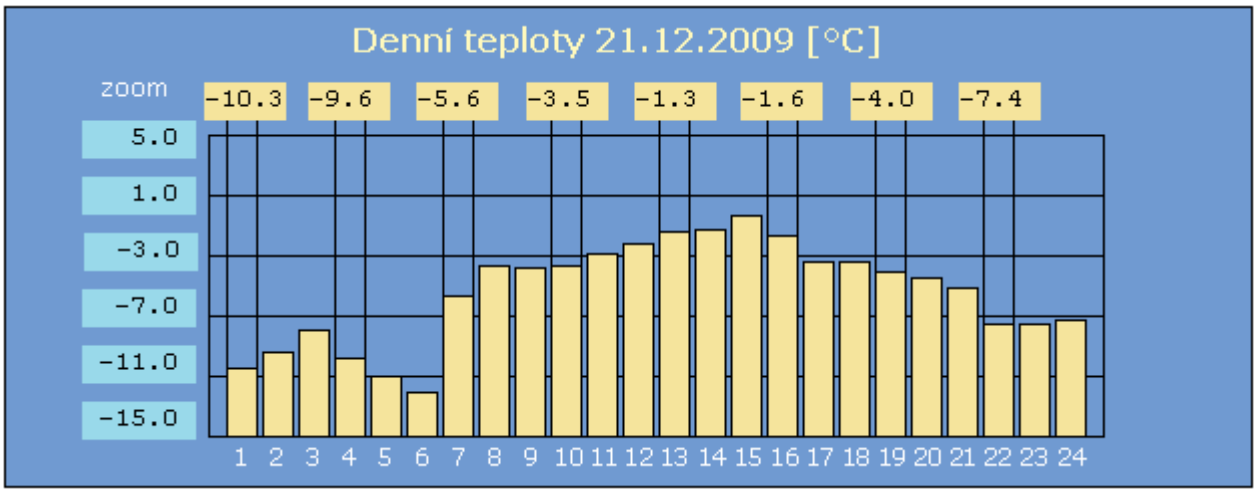
Function block *fbSimpleGraph1Real_32C* is used as a support for the graph of one variable of the REAL type. Maximum number of displayed samples is 32.

Variable description :

	Variable	*Type*	*Signification*
VAR_INPUT			
	refr	BOOL R_EDGE	Entering edge on this input causes the re-count of input variables for the graph
	home	BOOL R_EDGE	Graph control from the web page Graph displays 32 values before the array beginning
	bck	BOOL R_EDGE	Graph control from the web page Graph shift 16 values to the array beginning
	prv	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array beginning
	center	BOOL R_EDGE	Graph control from the web page

	Variable	*Type*	*Signification*
			Graph displays 32 values in the array center
	nxt	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array end
	fwd	BOOL R_EDGE	Graph control from the web page Graph shift 16 values to the array end
	end	BOOL R_EDGE	Graph control from the web page Graph displays 32 values before the array end
	fit	BOOL	Graph control from the web page TRUE sets the range of axis Y according to actual minimum and maximum value displayed in the graph, FALSE sets the range of axis Y according to input variables *minY* a *maxY*
	roll	BOOL	Graph control from the web page TRUE switch on the graph roll, FALSE switch off graph roll
	minY	REAL	Min value on the axis Y
	maxY	REAL	Max value on the axis Y
	numColumn	INT	Number of graph columns on the web page (max. 32)
	numViewCol	INT	Number of actually displayed columns of the graph (max. 32)
	columnSize	UINT	Max size of one column of the graph in pixels
	bufY	PTR_TO REAL	Address of array of values that will be displayed on the axis Y. The array must be of the type ARRAY[] OF REAL.
	bufX	PTR_TO REAL	Address of array of values that will be displayed on the axis X. The array must be of the type ARRAY[] OF REAL.
	bufSize	INT	Number of item of the array that is displayed in the graph
VAR_OUTPUT			
	descAxisX	ARRAY OF REAL	Axis X description for the graph
	descAxisY	TDescAxisY	Axis Y description for the graph
	graphView	ARRAY OF TGraphView1Real	Values displayed in the graph together with the size of columns in pixels
	rollStat	BOOL	Status of input *roll*

	Variable	*Type*	*Signification*
	rollON	BOOL	TRUE if the status of input roll changes from FALSE to TRUE, otherwise, FALSE
	rollOFF	BOOL	TRUE if the status of input roll changes from TRUE to FALSE, otherwise, FALSE



Individual columns of the graph are controlled by variables *DailyTemp.SimpleGraph1.graphView[0].valPx ...DailyTemp.SimpleGraph1.graphView[23].valPx*

Values displayed in the graph header are controlled by variables *DailyTemp.-SimpleGraph1.graphView[0].val ...DailyTemp.SimpleGraph1.graphView[23].val*

Descriptions of axis Y are displayed from variables *DailyTemp.SimpleGraph1.descAxisY[0] ... DailyTemp.SimpleGraph1.descAxisY[10]*.

The example of the program with function block *fbSimpleGraph1Real_32C* :

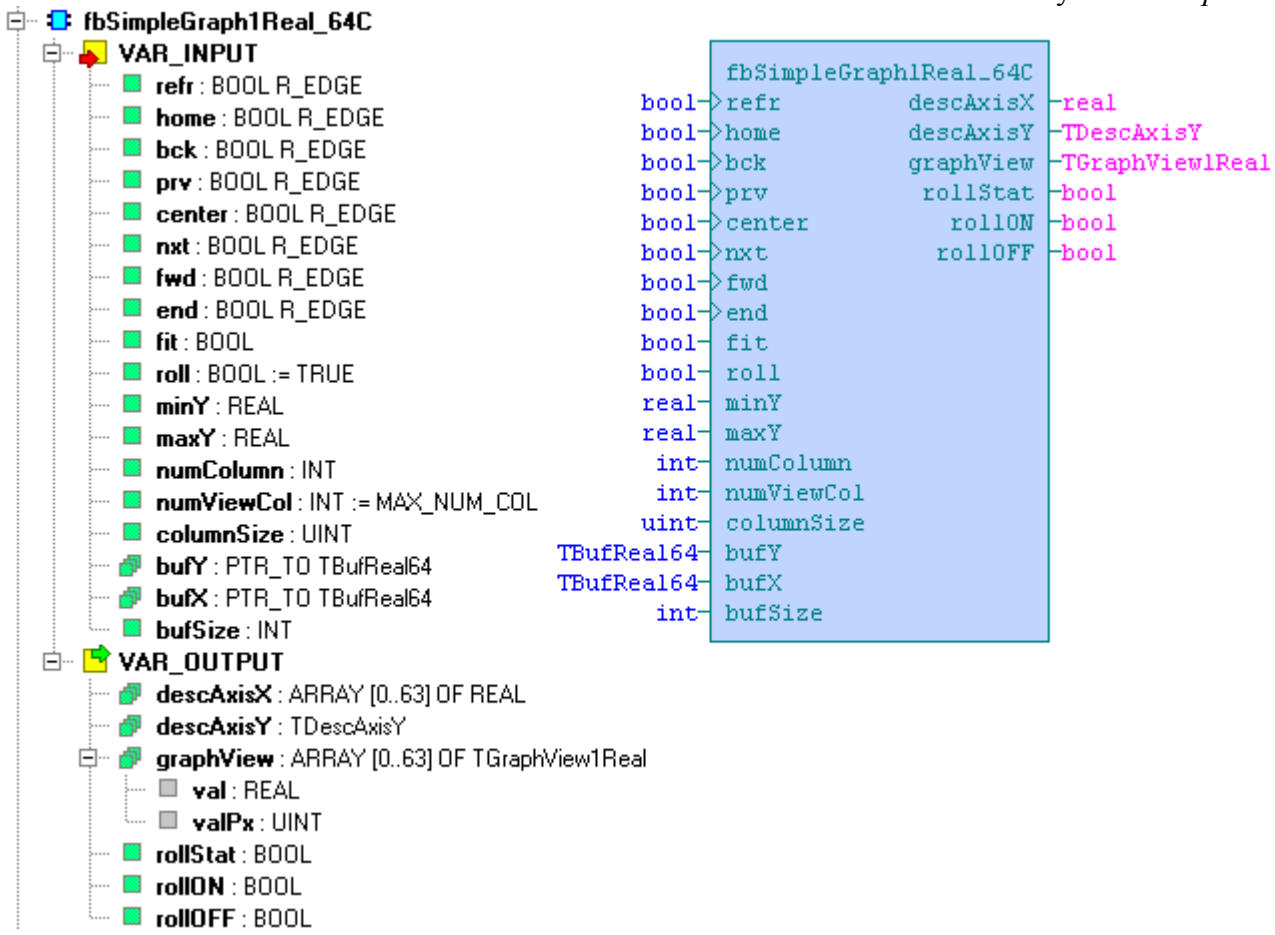
```
VAR_GLOBAL
  temp_2009_12_21 : ARRAY[1..24] OF REAL :=
  [ -10.3, -9.3, -7.8, -9.6, -10.8, -11.9, -5.6, -3.6, -3.7, -3.5, -2.8, -2.1,
    -1.3, -1.1, -0.2, -1.6, -3.3, -3.3, -4.0, -4.3, -5.0, -7.4, -7.4, -7.1];
END_VAR

PROGRAM prgDailyTemp
  VAR
    SimpleGraph1 : fbSimpleGraph1Real_32C;
  END_VAR

  // spocitat hodnoty pro graf
   SimpleGraph1( minY       := -15.0,
                 maxY       := 5.0,
                 numColumn  := 24,
                 numViewCol := 24,
                 columnSize := 150,
                 bufY       := ADR( temp_2009_12_21),
                 bufX       := NULL_PTR,
                 bufSize    := 24);
```

```
END_PROGRAM
```

See also Function InsertToGraphReal, Function SwitchRollGraphReal

6.3 Function block fbSimpleGraph1Real_64C

Library : *WebGraphLib*



Function block *fbSimpleGraph1Real_64C* is used as a support for the graph of one variable of the REAL type. Max number of displayed samples is 64.

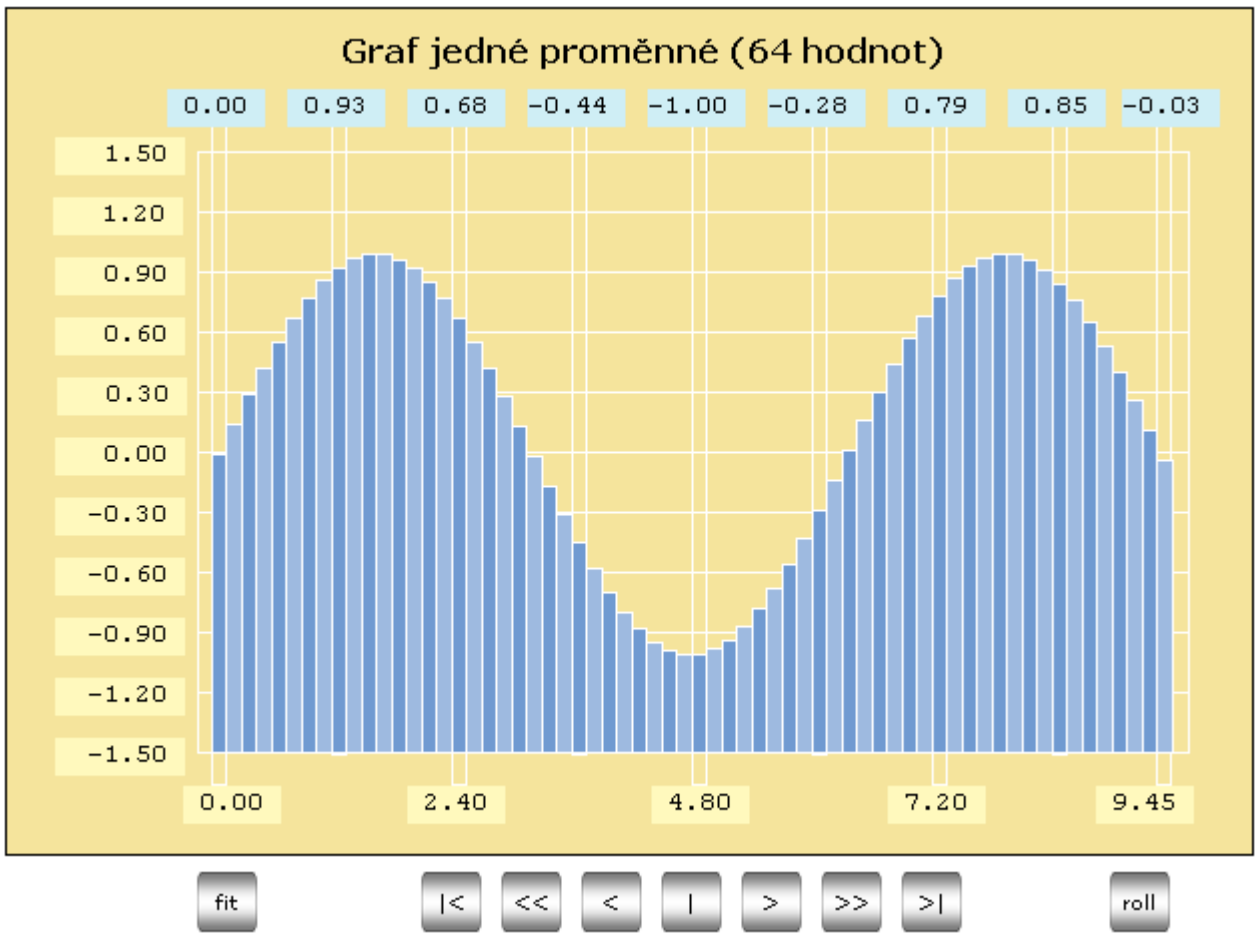
Variable description:

	Variable	*Type*	*Signification*
VAR_INPUT			
	refr	BOOL R_EDGE	Entering edge on this input causes the re-count of input variables for the graph
	home	BOOL R_EDGE	Graph control from the web page Graph displays 64 values before the array beginning
	bck	BOOL R_EDGE	Graph control from the web page Graph shift 32 values to the array beginning
	prv	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array beginning
	center	BOOL R_EDGE	Graph control from the web page Graph displays 64 values in the array center

	Variable	*Type*	*Signification*
	nxt	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array end
	fwd	BOOL R_EDGE	Graph control from the web page Graph shift 32 values to the array end
	end	BOOL R_EDGE	Graph control from the web page Graph displays 64 values before the array end
	fit	BOOL	Graph control from the web page TRUE sets the range of axis Y according to actual minimum and maximum value displayed in the graph, FALSE sets the range of axis Y according to input variables *minY* a *maxY*
	roll	BOOL	Graph control from the web page TRUE switch on the graph roll, FALSE switch off graph roll
	minY	REAL	Min value on the axis Y
	maxY	REAL	Max value on the axis Y
	numColumn	INT	Number of graph columns on the web page (max. 64)
	numViewCol	INT	Number of actually displayed columns of the graph (max. 64)
	columnSize	UINT	Max size of one column of the graph in pixels
	bufY	PTR_TO REAL	Address of array of values that will be displayed on the axis Y. The array must be of the type ARRAY[] OF REAL.
	bufX	PTR_TO REAL	Address of array of values that will be displayed on the axis X. The array must be of the type ARRAY[] OF REAL.
	bufSize	INT	Number of item of the array that is displayed in the graph
VAR_OUTPUT			
	descAxisX	ARRAY OF REAL	Axis X description for the graph
	descAxisY	TDescAxisY	Axis Y description for the graph
	graphView	ARRAY OF TGraphView1Real	Values displayed in the graph together with the size of columns in pixels
	rollStat	BOOL	Status of input *roll*
	rollON	BOOL	TRUE if the status of input roll changes from FALSE to TRUE,

	Variable	*Type*	*Signification*
			otherwise, FALSE
	rollOFF	BOOL	TRUE if the status of input roll changes from TRUE to FALSE, otherwise, FALSE

The following example shows the display of variable (sinus). Web page for the graph can appear, for example, as follows:



The example of the program with the function block *fbSimpleGraph1Real_64C* :

```
VAR_GLOBAL
  graphSinus : fbSimpleGraph1Real_64C;
END_VAR

PROGRAM prgSinus
  VAR CONSTANT
    NUM_SAMPLES : INT := 128;
  END_VAR
  VAR
    liveSinus : ARRAY[0..NUM_SAMPLES-1] OF REAL; // sin (axis Y) - live data
    liveArgs  : ARRAY[0..NUM_SAMPLES-1] OF REAL; // arg (axis X) - live data
    viewSinus : ARRAY[0..NUM_SAMPLES-1] OF REAL; // sin (axis Y) - roll OFF data
    viewArgs  : ARRAY[0..NUM_SAMPLES-1] OF REAL; // arg (axis X) - roll OFF data
```

```
    arg       : REAL := 0.0;
    dataY     : UDINT;
    dataX     : UDINT;
  END_VAR
  VAR_EXTERNAL
    AT %S20.0      : BOOL;                          // time base
  END_VAR

  // prepare value for graph
  IF %S20.0 THEN
    // axis Y
    InsertToGraphReal( save := TRUE, newVal := sin( arg),
                       liveBuf := ADR(liveSinus), sizeBuf := NUM_SAMPLES);
    // axis X
    InsertToGraphReal( save := TRUE, newVal := arg,
                       liveBuf := ADR(liveArgs), sizeBuf := NUM_SAMPLES);
    arg := arg + 0.15;
    IF arg > 157.0 THEN arg := 0.0; END_IF;
  END_IF;

  // switch roll ON/OFF
  dataY :=  SwitchRollGraphReal( rollStat  := graphSinus.rollStat,
                                 rollOff   := graphSinus.rollOFF,
                                 liveBuf   := ADR(liveSinus),
                                 staticBuf := ADR(viewSinus),
                                 sizeBuf   := NUM_SAMPLES);
  dataX :=  SwitchRollGraphReal( rollStat  := graphSinus.rollStat,
                                 rollOff   := graphSinus.rollOFF,
                                 liveBuf   := ADR(liveArgs),
                                 staticBuf := ADR(viewArgs),
                                 sizeBuf   := NUM_SAMPLES);

  // process graph values
  graphSinus( refr := %S20.0,
              sizeBuf    := NUM_SAMPLES,
              minY       := -2.5,
              maxY       := 2.5,
              numColumn  := 64,
              columnSize := 300,
              bufY       := UDINT_TO_PTR(dataY),
              bufX       := UDINT_TO_PTR(dataX));

END_PROGRAM
```

See further Function InsertToGraphReal, Function SwitchRollGraphReal

6.4 Function block fbSimpleGraph2Real_32C

Library : *WebGraphLib*

Function block *fbSimpleGraph1Real_32C* sis used as a support for the graph of two variables of REAL type. Max number of displayed samples is 32.

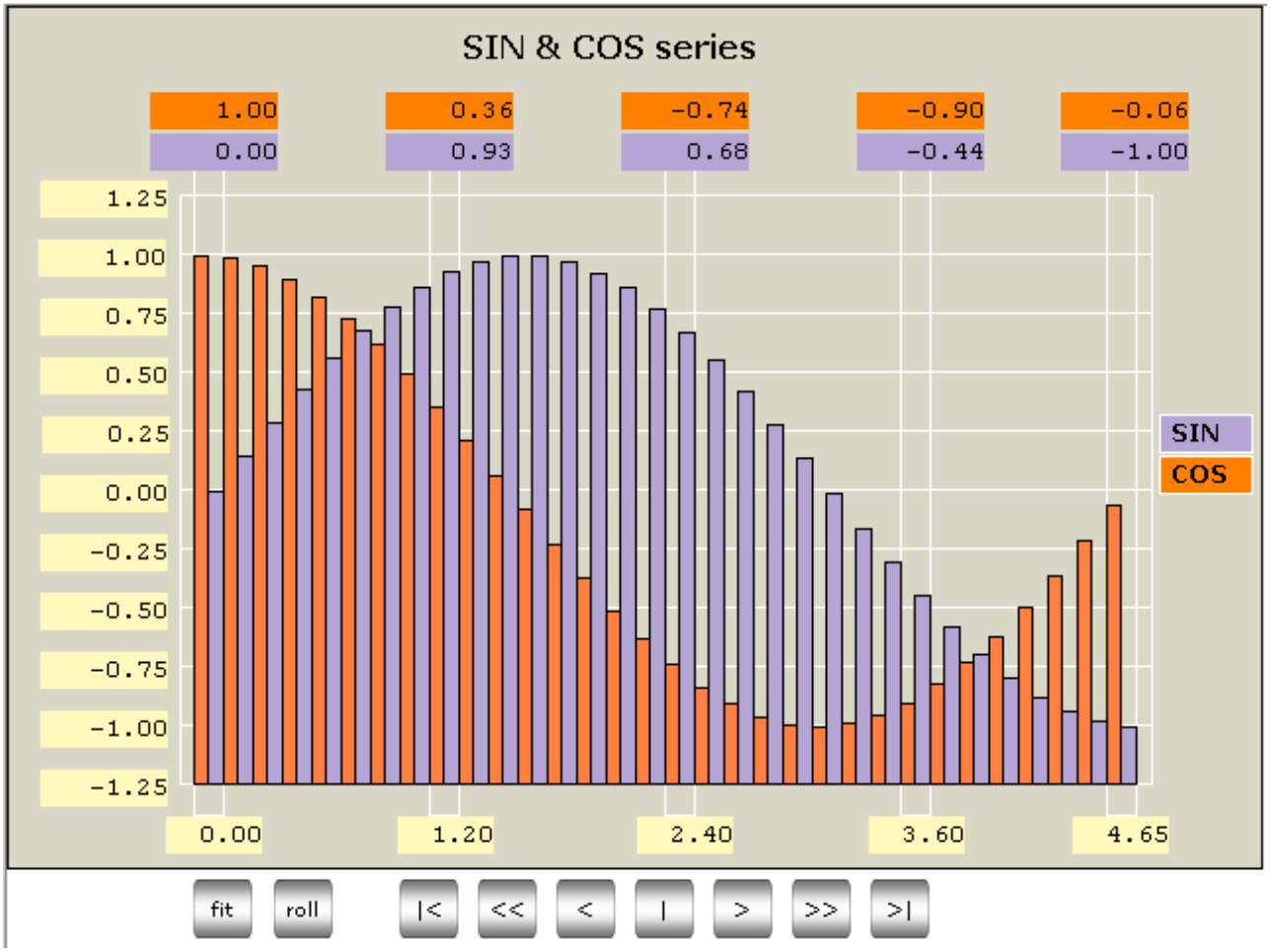
Variable description :

	Variable	*Type*	*Signification*
VAR_INPUT			
	refr	BOOL R_EDGE	Entering edge on this input causes the re-count of input variables for the graph
	home	BOOL R_EDGE	Graph control from the web page Graph displays 32 values before the array beginning
	bck	BOOL R_EDGE	Graph control from the web page Graph shift 16 values to the array beginning
	prv	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array beginning

	Variable	*Type*	*Signification*
	center	BOOL R_EDGE	Graph control from the web page Graph displays 32 values in the array center
	nxt	BOOL R_EDGE	Graph control from the web page Graph shift 1 value to the array end
	fwd	BOOL R_EDGE	Graph control from the web page Graph shift 16 values to the array end
	end	BOOL R_EDGE	Graph control from the web page Graph displays 32 values before the array end
	fit	BOOL	Graph control from the web page TRUE sets the range of axis Y according to actual minimum and maximum value displayed in the graph, FALSE sets the range of axis Y according to input variables *minY* a *maxY*
	roll	BOOL	Graph control from the web page TRUE switch on the graph roll, FALSE switch off graph roll
	minY	REAL	Min value on the axis Y
	maxY	REAL	Max value on the axis Y
	numColumn	INT	Number of graph columns on the web page (max. 32)
	columnSize	UINT	Max size of one column of the graph in pixels
	bufY1	PTR_TO REAL	Address of array of values that will be displayed on the axis Y. The array must be of the type ARRAY[] OF REAL.
	bufY2	PTR_TO REAL	Address of array of values that will be displayed on the axis Y. The array must be of the type ARRAY[] OF REAL.
	bufX	PTR_TO REAL	Address of array of values that will be displayed on the axis X. The array must be of the type ARRAY[] OF REAL.
	bufSize	INT	Number of item of the array that is displayed in the graph
VAR_OUTPUT			
	descAxisX	ARRAY OF REAL	Axis X description for the graph
	descAxisY	TDescAxisY	Axis Y description for the graph
	graphView	ARRAY OF TGraphView2Real	Values of both variables displayed in the graph together with the size of columns in pixels

	Variable	*Type*	*Signification*
	rollStat	BOOL	Status of input *roll*
	rollON	BOOL	TRUE if the status of input roll changes from FALSE to TRUE, otherwise, FALSE
	rollOFF	BOOL	TRUE if the status of input roll changes from TRUE to FALSE, otherwise, FALSE

The following example shows the display of variable (sinus, cosinus). Web page for the graph can appear, for example, as follows:



Control buttons on the web page are bounded onto the input variables of the function block of the graph (*DoubleLongGraph1*). button „fit“ controls variable *DoubleLongGraph1.fit*, button „roll“ control variable *DoubleLongGraph1.roll*, etc. Max number of values that can be viewed in the graph is 128 (see constant *NUM_SAMPLES*).

Descriptions of axis Y are displayed from variables *DoubleLongGraph1.descAxisY[0]* ... *DoubleLongGraph1.descAxisY[10]*.

Similarly, descriptions of axis X contain variables *DoubleLongGraph1.descAxisX[0]* ... *DoubleLongGraph1.descAxisX[31]*.

The example of the program with function block *fbSimpleGraph2Real_32C* :

```
VAR_GLOBAL
    DoubleLongGraph1 : fbSimpleGraph2Real_32C; // function block of Graph
    clk AT %S20.1    : BOOL;                   // time clock
END_VAR

PROGRAM prgTwoCurves
  VAR CONSTANT
    NUM_SAMPLES : INT := 128;
  END_VAR
  VAR
    sinus       : ARRAY[0..NUM_SAMPLES-1] OF REAL;          // sin values
    cosinus     : ARRAY[0..NUM_SAMPLES-1] OF REAL;          // cos values
    arguments   : ARRAY[0..NUM_SAMPLES-1] OF REAL;          // arg
    viewSinus   : ARRAY[0..NUM_SAMPLES-1] OF REAL;
    viewCosinus : ARRAY[0..NUM_SAMPLES-1] OF REAL;
    viewArgs    : ARRAY[0..NUM_SAMPLES-1] OF REAL;
    arg         : REAL := 0.0;
    dataSin     : UDINT;
    dataCos     : UDINT;
    dataArg     : UDINT;
  END_VAR

  // new values of graph
  IF clk THEN
    // axis Y - sin
    InsertToGraphReal( save := TRUE, newVal := sin( arg),
                       liveBuf := ADR(sinus), sizeBuf := NUM_SAMPLES);
    // axis Y - cos
    InsertToGraphReal( save := TRUE, newVal := cos( arg),
                       liveBuf := ADR(cosinus), sizeBuf := NUM_SAMPLES);
    // axis X
    InsertToGraphReal( save := TRUE, newVal := arg,
                       liveBuf := ADR(arguments), sizeBuf := NUM_SAMPLES);
    arg := arg + 0.15;
    IF arg > 157.0 THEN arg := 0.0; END_IF;
  END_IF;

  // switch roll ON/OFF
  dataSin :=  SwitchRollGraphReal( rollStat  := DoubleLongGraph1.rollStat,
                                   rollOff   := DoubleLongGraph1.rollOFF,
                                   liveBuf   := ADR(sinus),
                                   staticBuf := ADR(viewSinus),
                                   sizeBuf   := NUM_SAMPLES);
  dataCos :=  SwitchRollGraphReal( rollStat  := DoubleLongGraph1.rollStat,
                                   rollOff   := DoubleLongGraph1.rollOFF,
                                   liveBuf   := ADR(cosinus),
                                   staticBuf := ADR(viewCosinus),
                                   sizeBuf   := NUM_SAMPLES);
  dataArg :=  SwitchRollGraphReal( rollStat  := DoubleLongGraph1.rollStat,
                                   rollOff   := DoubleLongGraph1.rollOFF,
                                   liveBuf   := ADR(arguments),
                                   staticBuf := ADR(viewArgs),
                                   sizeBuf   := NUM_SAMPLES);

  // process graph values
  DoubleLongGraph1( refr       := clk,
                    sizeBuf    := NUM_SAMPLES,
                    minY       := -1.25,
                    maxY       := 1.25,
                    numColumn  := 32,
                    columnSize := 300,
                    bufY1      := UDINT_TO_PTR(dataSin),
```

```
                    bufY2       := UDINT_TO_PTR(dataCos),
                    bufX        := UDINT_TO_PTR(dataArg));
END_PROGRAM
```

See also Function InsertToGraphReal, Function SwitchRollGraphReal

7 THE EXAMPLE OF USE