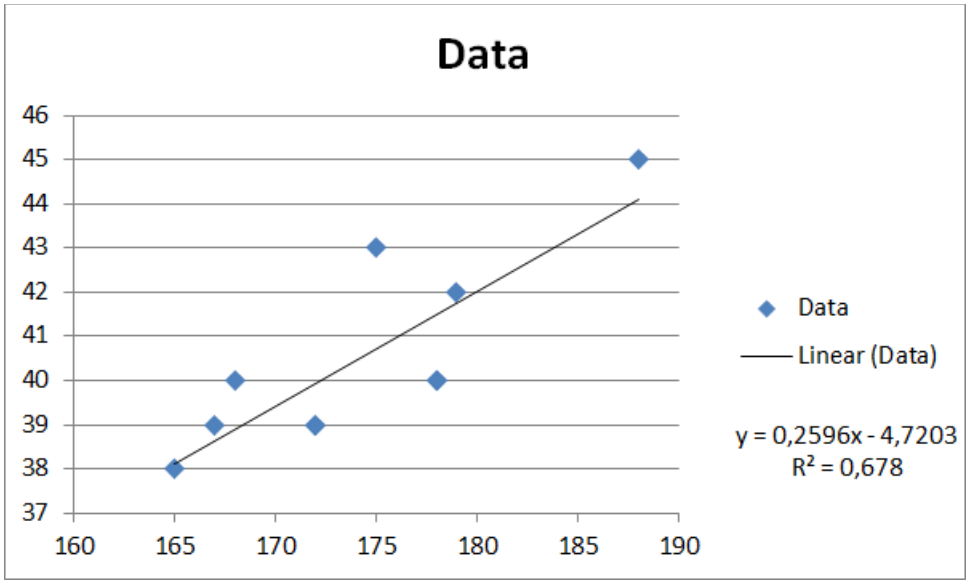
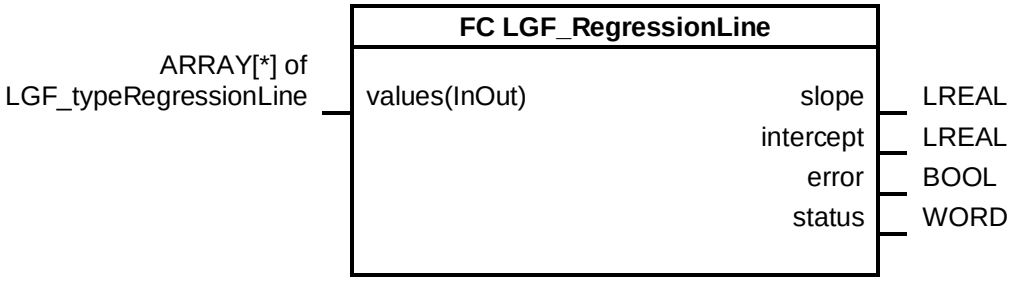
LGF_RegressionLine

Short description

The simplest case of a regression is the regression line. This means that the assumed relationship between the input and output signal is a linear straight line.



Block



Input/output parameters (InOut)

Parameters	Data type	Description
values	ARRAY[*] of LGF_typeRegressionLine	The data points are transferred with their X and Y values. The data type “LGF_typeRegressionLine” has the following structure: • x (Real) • y (Real)

Output parameters

Parameters	Data type	Description
slope	LREAL	Gradient of straight line
intercept	LREAL	The intersection with the Y axis
error	BOOL	FALSE: No error TRUE: An error occurred during the execution of the FB.
status	WORD	16#0000-16#7FFF: Status of the FB, 16#8000-16#FFFF: Error identification (see following Table).

Status and error displays

status	Meaning	Remedy / notes
16#0000	No error	Processing was completed successfully
16#8200	Too few values	The block requires at least two pairs of values to calculate a regression line. Increase the size of the array at the input parameter “values” in the second dimension.

Principle of operation

The block calculates the regression line with the following line equation:

$f(x) = a + b * x$

b: Gradient of straight line

a: Intersection with y-axis

The gradient b is calculated using the following equation:

$$b = \frac{n * \sum_1^N (x(n) * y(n)) - (\sum_1^N x(n) * \sum_1^N y(n))}{n * \sum_1^N x^2(n) - (\sum_1^N x(n) * \sum_1^N x(n))}$$

The intersection with the Y axis is calculated using the following equation:

$$a = \frac{\sum_1^N y(n)}{N} - b * \frac{\sum_1^N x(n)}{N}$$

Further information on libraries in TIA Portal:

- Topic page libraries
  https://support.industry.siemens.com/cs/ww/en/view/109738702
- Guideline on Library Handling
  https://support.industry.siemens.com/cs/ww/en/view/109747503
- Programming Guideline for S7-1200/1500 in chapter “Libraries”
  https://support.industry.siemens.com/cs/ww/en/view/81318674
- Programming Styleguide
  https://support.industry.siemens.com/cs/ww/en/view/81318674