LGF_MatrixMultiplication

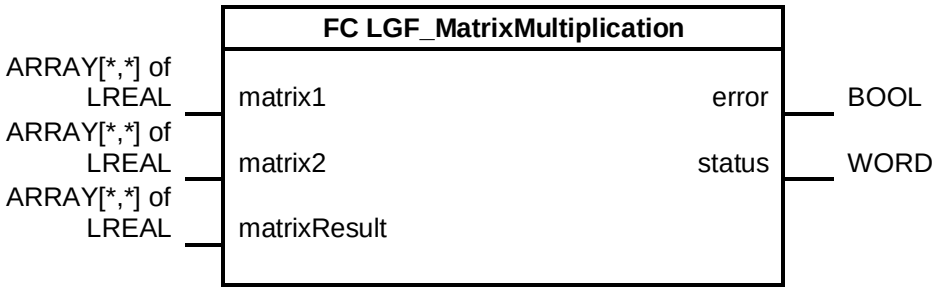
Short description

This block multiplies two matrices of the data type ARRAY[*,*] of LREAL.

Example for 2x2 matrix:

$$\begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} * \begin{pmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{pmatrix} = \begin{pmatrix} a_{11}b_{11} + a_{12}b_{21} & a_{11}b_{12} + a_{12}b_{22} \\ a_{21}b_{11} + a_{22}b_{21} & a_{21}b_{12} + a_{22}b_{22} \end{pmatrix}$$

Block



Input/output parameters (InOut)

Parameters	Data type	Description
matrix1	ARRAY[*,*] of LREAL	First factor: Matrix to multiply
matrix2	ARRAY[*,*] of LREAL	Second factor: Matrix to multiply
matrix Result	ARRAY[*,*] of LREAL	Product: The resulting matrix

Output parameters

Parameters	Data type	Description
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	-
16#8200	Lower-limit columns(Dim2) of the array of Matrix1 and lower-limit rows(Dim1) of the array of Matrix2 are different.	-
16#8201	Upper-limit columns(Dim2) of the array of Matrix1 and upper-limit rows(Dim1) of the array of Matrix2 are different.	-
16#8202	Lower-limit rows(Dim1) of the arrays of Matrix1 and Result Matrix are different.	-
16#8203	Upper-limit columns(Dim2) of the arrays of Matrix2 and Result Matrix are different.	-
16#8204	Upper-limit rows(Dim1) of the arrays of Matrix1 and Result Matrix are different.	-
16#8205	Upper-limit columns(Dim2) of the arrays of Matrix1 and Result Matrix are different.	-

Principle of operation

The block multiplies two matrices of variable size. The individual elements of the two incoming matrices are read, multiplied, and then output in the “matrix Result” matrix.

Note

Note that the number of columns in the first matrix must be equal to the number of rows in the second matrix.

The size of the initial matrix (m * n) results from the number of rows (m) of “matrix1” and the number of columns (n) of “matrix2”.

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