**mnkpoly**

*Function of calculating polynomial approximant of tabulated function with specified root-mean-square deviation for every point.*

**Syntax:**

*P* = **mnkpoly**(*X, Y, S, n*);

**Arguments:**

*X* – input array of coordinates *х* for tabulated function *Y*(*X*),

*Y* – input array of coordinates *y* for tabulated function *Y*(*X*),

*S* – input array of root-mean-square deviation for every coordinate of tabulated function *Y*(*X*),

*n* – degree of polynomial approximant, integer.

**Description:**

*mnkpoly(A, B)* – function returns array of coefficients of polynomial of degree *n* obtained as a result of approximation of tabulated function *Y*(*X*) with specified root-mean-square deviation *S* for every point. Calculation is carried out by means of a singular matrix convertion (SVD). If the values of root-mean-square deviation are unknown, they can be assigned equal to one.

Input arrays *X, Y, S* can be assigned:

* as variables of array type determined earlier:

*P* = **mnkpoly** (*X, Y, S, n*);

* as arrays consisting of variables determined earlier:

*P* = **mnkpoly** ([*x1,x2,x3,x4*],[*x1,x2,x3,x4*], [*s1,s2,s3,s4*], n);

* as constant arrays:

*P* = **mnkpoly** ([0, 1, 6, 9],[-1, 5, 0, 4], [0.1, 0.5, 0.7, 0.4], 2);

**Result:**

*P* – output array comprising coefficients of polynomial obtained as a result of approximation of tabulated function:

p(t) = p0+p1t+p2t2+…+pntn

Output array features dimensionality *n*+1.

**Example:**

|  |  |
| --- | --- |
|  | **initialization**  X = [0, 1 , 6, 9];  Y = [-1, 5, 0, 4];  S = [0.1, 0.5 0.7 0.4];  P = **mnkpoly**(X,Y,S,2);  **end**;  Z = **polyval**(P, X); |

As a result, elements of array *P* will be assigned values [-0.86580269, 1.4435988 , -0.10695525], which are coefficients of polynomial of the 2nd stage

p(t) = -0.86580269+1.4435988 t+0.10695525t2

obtained as a result of approximation, elements of array *Z* will be assigned values [-0.86580269 , 0.47084084 , 3.9454009 , 3.4632108], which are the values of calculated polynomial p(t) from arguments specified by array X.