

spline3() — Cubic spline interpolation

Syntax	Description	Remarks and examples	Conformability
Diagnostics	Reference	Also see	

Syntax

real matrix `spline3`(*real vector* x , *real vector* y)

real vector `spline3eval`(*real matrix* `spline_info`, *real vector* x)

Description

`spline3`(x , y) returns the coefficients of a cubic natural spline $S(x)$. The elements of x must be strictly monotone increasing.

`spline3eval`(`spline_info`, x) uses the information returned by `spline3`() to evaluate and return the spline at the abscissas x . Elements of the returned result are set to missing if outside the range of the spline. x is assumed to be monotonically increasing.

Remarks and examples

[stata.com](https://www.stata.com)

`spline3`() and `spline3eval`() is a translation into Mata of [Herriot and Reinsch \(1973\)](#) (CUBNATSPLINE).

For xx in $[x_i, x_{i+1})$:

$$S(xx) = \{(d_i t + c_i)t + b_i\}t + y_i$$

with $t = xx - x_i$.

`spline3`() returns (b, c, d, x, y) or, if x and y are row vectors, (b, c, d, x', y') .

Conformability

`spline3`(x , y):

x :	$n \times 1$	or	$1 \times n$
y :	$n \times 1$	or	$1 \times n$
<i>result</i> :	$n \times 5$		

`spline3eval`(`spline_info`, x):

<code>spline_info</code> :	$n \times 5$		
x :	$m \times 1$	or	$1 \times m$
<i>result</i> :	$m \times 1$	or	$1 \times m$

Diagnostics

`spline3(x, y)` requires that x be in ascending order.

`spline3eval(spline_info, x)` requires that x be in ascending order.

Reference

Herriot, J. G., and C. H. Reinsch. 1973. Algorithm 472: Procedures for natural spline interpolation [E1]. *Communications of the ACM* 16: 763–768.

Also see

[M-4] [mathematical](#) — Important mathematical functions