

spline3() — Cubic spline interpolation

Description	Syntax	Remarks and examples	Conformability
Diagnostics	Reference	Also see	

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.

Syntax

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

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

Remarks and examples

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

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):`

<i>spline_info:</i>	$n \times 5$		
$x:$	$m \times 1$	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. <https://doi.org/10.1145/362552.362558>.

Also see

[M-4] **Mathematical** — Important mathematical functions

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