1 SUMMARY

To compute the value of a cubic spline \( S(x) \) given in terms of its knot points \( \xi_i, i=1,2,...,n \) and its values \( S(\xi_i) \) and first derivative values \( S'(\xi_i) \) at the knots.

The spline value is defined to be zero outside the range. A facility is provided for reducing the search time for the knot interval containing the point at which the spline value is required; this makes tabulation of a spline economical.


2 HOW TO USE THE PACKAGE

2.1 The argument list and calling sequence

The single precision version

\[ S = \text{TG01B}(I,N,XN,FN,GN,X) \]

The double precision version

\[
\text{DOUBLE PRECISION } \text{TG01BD} \\
- - \\
S = \text{TG01BD}(I,N,XN,FN,GN,X)
\]

The arguments

- \( I \) is an INTEGER variable which must be set by the user to enable TG01B/BD to make use of known information. If \( I \geq 0 \) then TG01B/BD assumes that it has been entered previously with a smaller value of \( x \) (this reduces the number of knot intervals searched when locating the one containing \( x \)). If \( I < 0 \) the function searches the whole range.

- \( N \) is an INTEGER variable which must be set by the user to \( n \) the number of knots.

- \( XN \) is a REAL (DOUBLE PRECISION in the D version) array of length at least \( n \) which must be set by the user to the knot values \( \xi_i, i=1,2,...,n \).

- \( FN \) is a REAL (DOUBLE PRECISION in the D version) array of length at least \( n \) which the user must set to the spline values \( S(\xi_i), i=1,2,...,n \) at the knots.

- \( GN \) is a REAL (DOUBLE PRECISION in the D version) array of length at least \( n \) which must be set by the user to the first-derivative values \( S'(\xi_i), i=1,2,...,n \) at the knots.

- \( X \) is a REAL (DOUBLE PRECISION in the D version) variable which must be set by the user to the value of \( x \) for which the value of the spline is required.

Function value

TG01B and TG01BD are Fortran FUNCTION subroutines and will be set to the spline value \( S(x) \) on return. Note that TG01BD must be declared DOUBLE PRECISION to obtain the full precision from the result.
3 GENERAL INFORMATION

Workspace: None.
Use of common: None.
Other routines called directly: FD05.
Input/output: None.
Restrictions: None.