

## 1 SUMMARY

To **compute the value of a cubic spline**  $S(x)$  given in terms of its knot points  $\xi_i, i=1,2,\dots,n$  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.

**ATTRIBUTES** — **Version:** 1.0.0. **Types:** TG01B; TG01BD. **Calls:** FD05. **Original date:** 1966. **Origin:** M.J.Hopper, Harwell.

## 2 HOW TO USE THE PACKAGE

### 2.1 The argument list and calling sequence

*The single precision version*

```
S=TG01B(I,N,XN, FN, GN, X)
```

*The double precision version*

```
DOUBLE PRECISION TG01BD  
- -  
S=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  $\xi_i, i=1,2,\dots,n$ .
- 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  $S(\xi_i), i=1,2,\dots,n$  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  $S'(\xi_i), i=1,2,\dots,n$  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.