1 SUMMARY

To **interpolate the value of a function** given n function values f_i at points x_i, i=1, 2,..., n, not necessarily equally spaced.

The interpolation is based on the (n–1)th degree polynomial which passes through the n points obtained by the Lagrange interpolation formula. The coefficients of the polynomial are not computed.

ATTRIBUTES — Version: 1.0.0. **Types:** `TB02A; TB02AD.` **Original date:** May 1963. **Origin:** A.G.Hearn, Harwell.

2 HOW TO USE THE PACKAGE

2.1 Argument list

The single precision version

```
CALL TB02A(X,F,XVAL,FVAL,N)
```

The double precision version

```
CALL TB02AD(X,F,XVAL,FVAL,N)
```

`X` is a `REAL` (`DOUBLE PRECISION` in the D version) array which must be set by the user to contain the values of the points x_i i=1, 2,..., n. It is not altered by the subroutine. **Restriction:** all the points x_i i=1, 2,..., n must be different.

`F` is a `REAL` (`DOUBLE PRECISION` in the D version) array which must be set by the user to contain the values f_i, i=1, 2,..., n, of the tabulated function. It is not altered by the subroutine.

`XVAL` 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 interpolated value of $f(x)$ is required. It is not altered by the subroutine.

`FVAL` is a `REAL` (`DOUBLE PRECISION` in the D version) variable which will be set by the subroutine to the interpolated value of $f(x)$ at the point given in `XVAL.`

`N` is an `INTEGER` variable which must be set by the user to n, the number of function values passed in the array `F.` It is not altered by the subroutine.

3 GENERAL INFORMATION

Use of common: None.

Workspace: None.

Other routines called directly: None.

Input/output: None.

Restrictions: The x_i must be distinct.

4 METHOD

This subroutine evaluates the interpolated value from first principles at each call, consequently the number of operations is of the order of n^2. This is inefficient if many interpolations are required because it is then better to evaluate the explicit coefficients of the (n–1)th order polynomial, so that the number of operations for each interpolation is of order n.