1 SUMMARY

To compute values of the complete elliptic integral of the 3rd kind, viz.

\[ \Pi(n, m) = \int_0^\pi \frac{(1 - m^2 \sin^2 \theta)^{-1/2}}{(1 - n \sin^2 \theta)} d\theta \quad 0 \leq m^2 \leq 1 \]

The integral is represented in terms of complete and incomplete elliptic integrals of the 1st and 2nd kind and the subroutines FB01A and FB02A are used to obtain the required values.


2 HOW TO USE THE PACKAGE

The single precision version

CALL FB03A(EN, EMSQ, PI)

The double precision version

CALL FB03AD(EN, EMSQ, PI)

EN is a REAL (DOUBLE PRECISION in the D version) variable which must be set by the user to the floating point value of \( n \).

EMSQ is a REAL (DOUBLE PRECISION in the D version) variable which must be set by the user to the floating point value of \( m^2 \). Restriction: \( 0 \leq m^2 \leq 1 \).

PI is a REAL (DOUBLE PRECISION in the D version) variable which is set by the subroutine to the computed value of the integral \( \Pi(n, m) \).

3 GENERAL INFORMATION

Use of common: none.

Workspace: none.

Other subroutines: it calls library subroutines FB01A and FB02A.

Input/Output: none.

Restrictions: \( 0 \leq m^2 \leq 1 \).

4 METHOD

The integral is rewritten in terms of elliptic integrals of the first and second kinds and these are evaluated using FB01A and FB02A.