



## 1 SUMMARY

To compute values of the **incomplete elliptic integrals** of the **1st and 2nd kinds**, viz.

$$F(\psi, m) = \int_0^{\psi} (1 - m^2 \sin^2 \theta)^{-\frac{1}{2}} d\theta$$

$$E(\psi, m) = \int_0^{\psi} (1 - m^2 \sin^2 \theta)^{\frac{1}{2}} d\theta$$

where  $0 \leq m^2 \leq 1$  and  $0 \leq \psi \leq \frac{\pi}{2}$ .

**ATTRIBUTES** — **Version:** 1.0.0. **Types:** FB02A; FB02AD; **Calls:** FD05. **Original date:** Revised 1967. **Origin:** L.Morgan\*, Harwell.

## 2 HOW TO USE THE PACKAGE

*Single precision version*

```
CALL FB02A(EMSQ, SINP, COSP, E, F)
```

*Double precision version*

```
CALL FB02AD(EMSQ, SINP, COSP, E, F)
```

EMSQ is a REAL (DOUBLE PRECISION in the D version) variable which must be set by the user to the value of  $m^2$ .

**Restriction:**  $0 \leq m^2 < 1$ .

SINP is a REAL (DOUBLE PRECISION in the D version) variable which must be set by the user to the value of  $\sin \psi$ , where  $\psi$  is the upper limit value of the integrals.

COSP is a REAL (DOUBLE PRECISION in the D version) variable which must be set by the user to the value of  $\cos \psi$ , see also SINP.

E is a REAL (DOUBLE PRECISION in the D version) variable which will be set by the subroutine to the computed value of the integral  $E(\psi, m)$ .

F is a REAL (DOUBLE PRECISION in the D version) variable which will be set by the subroutine to the computed value of the integral  $F(\psi, m)$ .

## 3 GENERAL INFORMATION

**Use of common:** none.

**Workspace:** none.

**Other subroutines:** calls FD05.

**Input/Output:** none.

**Restrictions:**

$0 \leq m^2 < 1$ .

**Accuracies:**

6 figures using 4-byte arithmetic  
14 figures using 8-byte arithmetic