1 SUMMARY

Computes values of the Bessel functions \( J_0(x) \) and \( Y_0(x) \). A Chebyshev series in \( x \) is used if \( 0 \leq x \leq 8 \) and a similar series in \( \frac{1}{x} \) if \( x > 8 \), see, C.W. Clenshaw, ‘Mathematical Tables’, Vol. 5, NPL.


2 HOW TO USE THE PACKAGE

The single precision version

\[
\text{CALL FF01A(VJO,VY0,X,N)}
\]

The double precision version

\[
\text{CALL FF01AD(VJO,VY0,X,N)}
\]

VJO is a REAL (DOUBLE PRECISION in the D version) variable which is set by the routine to the computed value of \( J_0(x) \).

VY0 is a REAL (DOUBLE PRECISION in the D version) variable which is set by the routine to the computed value of \( Y_0(x) \).

X is a REAL (DOUBLE PRECISION in the D version) variable which must be set by the user to the value of the argument \( x \). Restriction: \( x \neq 0 \), for a value of \( Y_0(x) \), but if \( x < 0 \) then \( |x| \) is used.

N is an INTEGER variable which must be set by the user to select \( J_0(x) \) only or both \( J_0(x) \) and \( Y_0(x) \), i.e.

\( N \leq 0 \) and \( x \leq 8 \): only \( J_0(x) \) is calculated.

Otherwise: both \( J_0(x) \) and \( Y_0(x) \) are calculated.

3 GENERAL INFORMATION

Use of common: none.

Workspace: none.

Other routines: none.

Input/Output: none.

Restrictions:
\( x \neq 0 \) for \( Y_0(x) \).

Accuracies:

- 6 sig. figs using 4-byte arithmetic.
- 9 sig. figs using 8-byte arithmetic.
4 METHOD

A Chebyshev series in $x$ is used if $0 \leq x \leq 8$ and a similar series in $\frac{1}{x}$ if $x > 8$, see, C.W. Clenshaw, ‘Mathematical Tables’, Vol. 5, NPL.