1 SUMMARY

To find all the roots of a cubic polynomial, i.e. calculate the zeros of

\[ a_0 + a_1x + a_2x^2 + a_3x^3 = 0 \]

a non-iterative method is used.


2 HOW TO USE THE PACKAGE

2.1 Argument list

The single precision version

\[ \text{CALL PA03A}(A, R, N) \]

The double precision version

\[ \text{CALL PA03AD}(A, R, N) \]

A is a REAL (DOUBLE PRECISION in the D version) array which must be set by the user to the four coefficients of the polynomial, i.e. set \( A(j+1) = a_j, j=0, 1, 2, 3 \).

R is a REAL (DOUBLE PRECISION in the D version) array which will be returned containing the roots found by the subroutine. In the case (\( N=3 \)) when there are three real roots they are returned in the order \( R(1) \leq R(2) \leq R(3) \). In the other case (\( N=1 \)) when there is one real root and two complex roots, the real root is returned in \( R(1) \), the real part of both complex roots is returned in \( R(2) \) and the imaginary part is returned in \( R(3) \). Note that in this case \( R(3) \) is always positive.

N is an INTEGER variable which is set by the subroutine to the number of real roots.

3 GENERAL INFORMATION

Workspace: None.

Use of common: None.

Other routines called directly: calls FD05.

Input/output: None.

Restrictions: None.

4 METHOD

A non-iterative method is used.