



1 SUMMARY

Finds the smallest set of non-overlapping intervals which are common to two given sets of non-overlapping intervals.

Specifically, given the two sets of disjoint closed intervals $\{a_1, b_1\}, \{a_2, b_2\}, \dots, \{a_m, b_m\}$ and $\{c_1, d_1\}, \{c_2, d_2\}, \dots, \{c_k, d_k\}$ where $a_i \leq b_i \leq a_{i+1}$ and $c_j \leq d_j \leq c_{j+1}$ the subroutine finds the set of disjoint closed intervals which are common to both i.e. $\{x_1, y_1\}, \{x_2, y_2\}, \dots, \{x_n, y_n\}$ where $0 \leq n \leq m+k-1$, and where each of the new intervals $\{x_r, y_r\}$ must be completely contained within $\{a_i, b_i\}$ and $\{c_j, d_j\}$ for some i and j .

ATTRIBUTES — **Version:** 1.0.0. **Types:** KC02A; KC02AD. **Original date:** March 1980. **Origin:** C.Birch*, Harwell.

2 HOW TO USE THE PACKAGE

2.1 The argument list and calling sequence

The single precision version

```
CALL KC02A(M, A, B, K, C, D, N, X, Y)
```

The double precision version

```
CALL KC02AD(M, A, B, K, C, D, N, X, Y)
```

M is an INTEGER variable set by the user to m the number of intervals in the first set.

A, B are REAL (DOUBLE PRECISION in the D version) arrays which must be set by the user to the first set of intervals $\{a_i, b_i\}, i=1,2,\dots,m$. **Restrictions:** $a_i \leq b_i, i=1,2,\dots,m, b_{i-1} \leq a_i, i=2,3,\dots,m$.

K is an INTEGER variable set by the user to k the number of intervals in the second set.

C, D are REAL (DOUBLE PRECISION in the D version) arrays which must be set by the user to the second set of intervals $\{c_i, d_i\}, i=1,2,\dots,k$. **Restrictions:** $c_i \leq d_i, i=1,2,\dots,k, d_{i-1} \leq c_i, i=2,3,\dots,k$.

N is an INTEGER variable set by the subroutine to n the number of disjoint intervals common to the original two sets.

X, Y are REAL (DOUBLE PRECISION in the D version) arrays in which the subroutine returns the intervals $\{x_i, y_i\}, i=1,2,\dots,n$.

2.2 The common area and diagnostic messages

The subroutine uses a common area which the user may also reference. To do this the calling program should include a common statement of the form

Single precision version

```
COMMON/KC02B/ LP, IFLAG, LIMIT
```

Double precision version

```
COMMON/KC02BD/ LP, IFLAG, LIMIT
```

LP is an INTEGER variable which specifies the Fortran stream number to be used for error messages. The default value is 6 (line printer). To suppress the printing of diagnostic messages set LP to zero or less.

IFLAG is an INTEGER variable which is always set by the subroutine to indicate success or failure. On exit from the

subroutine IFLAG can take the values

0 successful entry

0 IFLAG will equal the number of intervals given by the calling program which were found to be in error and were therefore ignored.

LIMIT is an INTEGER variable which controls the printing of intervals found to be in error. Up to (LIMIT - 1) intervals in error will be printed out and an extra message is produced if (LIMIT) errors occur. LIMIT has a default value of 4.

3 GENERAL INFORMATION

Use of Common: none.

Workspace: none.

Other subroutines: none.

Input/Output: none.

System dependence: none.