

NAG Fortran Library Routine Document

F06KJF

Note: before using this routine, please read the Users' Note for your implementation to check the interpretation of *bold italicised* terms and other implementation-dependent details.

1 Purpose

Given an n element complex vector x , and real scalars α and ξ , F06KJF returns updated values $\tilde{\alpha}$ and $\tilde{\xi}$ such that

$$\tilde{\alpha}^2 \tilde{\xi} = |x_1|^2 + |x_2|^2 + \cdots + |x_n|^2 + \alpha^2 \xi.$$

F06KJF is designed for use in the safe computation of the Euclidean norm of a complex vector, without unnecessary overflow or destructive underflow. An initial call to F06KJF (with $\xi = 1$ and $\alpha = 0$) may be followed by further calls to F06KJF and finally a call to F06BMF to complete the computation. Multiple calls of F06KJF may be needed if the elements of the vector cannot all be accessed in a single array X.

2 Specification

```
SUBROUTINE F06KJF (N, X, INCX, SCAL, SUMSQ)
  INTEGER          N, INCX
  double precision SCAL, SUMSQ
  complex*16      X(*)
```

3 Description

None.

4 References

None.

5 Parameters

- | | | |
|----|--|---------------------|
| 1: | N – INTEGER | <i>Input</i> |
| | <i>On entry:</i> n , the number of elements in x . | |
| 2: | X(*) – <i>complex*16</i> array | <i>Input</i> |
| | <i>On entry:</i> the vector x . | |
| 3: | INCX – INTEGER | <i>Input</i> |
| | <i>On entry:</i> the increment in the subscripts of X between successive elements of x . | |
| | <i>Constraint:</i> INCX > 0. | |
| 4: | SCAL – <i>double precision</i> | <i>Input/Output</i> |
| | <i>On entry:</i> the scaling factor α . | |
| | <i>Constraint:</i> SCAL \geq 0. | |
| | <i>On exit:</i> the updated scaling factor $\tilde{\alpha} = \max_i(\alpha, \operatorname{Re} x_i , \operatorname{Im} x_i)$. | |

5: SUMSQ – *double precision*

Input/Output

On entry: the scaled sum of squares ξ .

Constraint: $\text{SUMSQ} \geq 1$.

On exit: the updated scaled sum of squares $\tilde{\xi}$, satisfying: $1 \leq \tilde{\xi} \leq \xi + 2n$.

6 Error Indicators and Warnings

None.
