

NAG Fortran Library Routine Document

F06SAF (ZGEMV)

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

F06SAF (ZGEMV) performs one of the matrix-vector operations

$$y \leftarrow \alpha Ax + \beta y, \quad y \leftarrow \alpha A^T x + \beta y \quad \text{or} \quad y \leftarrow \alpha A^H x + \beta y$$

where A is an m by n complex matrix, x and y are complex vectors, and α and β are complex scalars.

If $m = 0$ or $n = 0$, no operation is performed.

2 Specification

```
SUBROUTINE F06SAF (TRANS, M, N, ALPHA, A, LDA, X, INCX, BETA, Y, INCY)
  INTEGER          M, N, LDA, INCX, INCY
  complex*16     ALPHA, A(LDA,*), X(*), BETA, Y(*)
  CHARACTER*1     TRANS
```

The routine may be called by its BLAS name *zgemv*.

3 Description

None.

4 References

None.

5 Parameters

- 1: TRANS – CHARACTER*1 *Input*
On entry: specifies the operation to be performed as follows:
 if TRANS = 'N', $y \leftarrow \alpha Ax + \beta y$;
 if TRANS = 'T', $y \leftarrow \alpha A^T x + \beta y$;
 if TRANS = 'C', $y \leftarrow \alpha A^H x + \beta y$.
Constraint: TRANS = 'N', 'T' or 'C'.
- 2: M – INTEGER *Input*
On entry: m , the number of rows of the matrix A .
Constraint: $M \geq 0$.
- 3: N – INTEGER *Input*
On entry: n , the number of columns of the matrix A .
Constraint: $N \geq 0$.
- 4: ALPHA – **complex*16** *Input*
On entry: the scalar α .

- 5: A(LDA,*) – **complex*16** array *Input*
Note: the second dimension of the array A must be at least $\max(1, N)$.
On entry: the m by n matrix A .
- 6: LDA – INTEGER *Input*
On entry: the first dimension of the array A as declared in the (sub)program from which F06SAF (ZGEMV) is called.
Constraint: $LDA \geq \max(1, M)$.
- 7: X(*) – **complex*16** array *Input*
On entry: the vector x , of length n if TRANS = 'N', or of length m if TRANS = 'T' or 'C'.
- 8: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: $INCX \neq 0$.
- 9: BETA – **complex*16** *Input*
On entry: the scalar β .
- 10: Y(*) – **complex*16** array *Input/Output*
On entry: the vector y , of length m if TRANS = 'N', or of length n if TRANS = 'T' or 'C'. If BETA = 0, Y need not be set.
On exit: the updated vector y .
- 11: INCY – INTEGER *Input*
On entry: the increment in the subscripts of Y between successive elements of y .
Constraint: $INCY \neq 0$.

6 Error Indicators and Warnings

None.
