

NAG Fortran Library Routine Document

F06PAF (DGEMV)

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

F06PAF (DGEMV) performs one of the matrix-vector operations

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

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

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

2 Specification

```
SUBROUTINE F06PAF (TRANS, M, N, ALPHA, A, LDA, X, INCX, BETA, Y, INCY)
  INTEGER          M, N, LDA, INCX, INCY
  double precision ALPHA, A(LDA,*), X(*), BETA, Y(*)
  CHARACTER*1     TRANS
```

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

3 Description

None.

4 References

None.

5 Parameters

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

- 5: A(LDA,*) – **double precision** 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 F06PAF (DGEMV) is called.
Constraint: $LDA \geq \max(1, M)$.
- 7: X(*) – **double precision** 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 – **double precision** *Input*
On entry: the scalar β .
- 10: Y(*) – **double precision** 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.
