

# NAG C Library Function Document

## dger (f06pmc)

### 1 Purpose

dger (f06pmc) performs the rank-1 update operation

$$A \leftarrow \alpha xy^T + A,$$

where  $A$  is an  $m$  by  $n$  real matrix,  $x$  is an  $m$  element real vector,  $y$  is an  $n$  element real vector, and  $\alpha$  is a real scalar.

### 2 Specification

```
#include <nag.h>
```

```
#include <nagf06.h>
```

```
void dger (Integer m, Integer n, double alpha, const double x[], Integer incx,
          const double y[], Integer incy, double a[], Integer tda)
```

### 3 Arguments

- |    |   |                     |
|----|---|---------------------|
| 1: | <b>m</b> – Integer  | <i>Input</i>        |
|    | <i>On entry:</i> $m$ , the number of rows of the matrix $A$ .                                     |                     |
|    | <i>Constraint:</i> $m \geq 0$ .   |                     |
| 2: | <b>n</b> – Integer  | <i>Input</i>        |
|    | <i>On entry:</i> $n$ , the number of columns of the matrix $A$ .                                  |                     |
|    | <i>Constraint:</i> $n \geq 0$ .   |                     |
| 3: | <b>alpha</b> – double   | <i>Input</i>        |
|    | <i>On entry:</i> the scalar $\alpha$ .  |                     |
| 4: | <b>x</b> [ <b>m</b> ] – const double  | <i>Input</i>        |
|    | <i>On entry:</i> the vector $x$ of length $m$ .   |                     |
| 5: | <b>incx</b> – Integer   | <i>Input</i>        |
|    | <i>On entry:</i> the increment in the subscripts of <b>x</b> between successive elements of $x$ . |                     |
|    | <i>Constraint:</i> <b>incx</b> $\neq 0$ .   |                     |
| 6: | <b>y</b> [ <b>n</b> ] – const double  | <i>Input</i>        |
|    | <i>On entry:</i> the vector $y$ of length $n$ .   |                     |
| 7: | <b>incy</b> – Integer   | <i>Input</i>        |
|    | <i>On entry:</i> the increment in the subscripts of <b>y</b> between successive elements of $y$ . |                     |
|    | <i>Constraint:</i> <b>incy</b> $\neq 0$ .   |                     |
| 8: | <b>a</b> [ <b>m</b> $\times$ <b>tda</b> ] – double  | <i>Input/Output</i> |
|    | <i>On entry:</i> the $m$ by $n$ matrix $A$ .  |                     |
|    | <i>On exit:</i> the updated matrix $A$ .  |                     |

9: **tda** – Integer

*Input*

*On entry:* the second dimension of the array **a** as declared in the function from which dger (f06pmc) is called.

*Constraint:* **tda**  $\geq$  max(1, **n**).

#### 4 Error Indicators and Warnings

If a function is called with an invalid argument then an error message is output on stderr, giving the name of the function and the number of the first invalid argument, and execution is terminated.

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