

NAG Library Routine Document

F16DLF

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

F16DLF sums the elements of an integer vector.

2 Specification

```
FUNCTION F16DLF (N, X, INCX)
INTEGER F16DLF
INTEGER N, X(1+(N-1)*ABS(INCX)), INCX
```

3 Description

F16DLF returns the sum

$$x_1 + x_2 + \cdots + x_n$$

of the elements of an n -element integer vector x , via the function name.

If $N \leq 0$ on entry, F16DLF immediately returns the value 0.

4 References

Basic Linear Algebra Subprograms Technical (BLAST) Forum (2001) *Basic Linear Algebra Subprograms Technical (BLAST) Forum Standard* University of Tennessee, Knoxville, Tennessee <http://www.netlib.org/blas/blast-forum/blas-report.pdf>

5 Arguments

- | | | |
|----|---|--------------|
| 1: | N – INTEGER | <i>Input</i> |
| | <i>On entry:</i> n , the number of elements in x . | |
| 2: | $X(1 + (N - 1) \times INCX)$ – INTEGER array | <i>Input</i> |
| | <i>On entry:</i> the n -element vector x . | |
| | If $INCX > 0$, x_i must be stored in $X((i - 1) \times INCX + 1)$, for $i = 1, 2, \dots, N$. | |
| | If $INCX < 0$, x_i must be stored in $X((N - i) \times INCX + 1)$, for $i = 1, 2, \dots, N$. | |
| | Intermediate elements of X are not referenced. If $N = 0$, X is not referenced. | |
| 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> $INCX \neq 0$. | |

6 Error Indicators and Warnings

If $INCX = 0$, an error message is printed and program execution is terminated.

7 Accuracy

The BLAS standard requires accurate implementations which avoid unnecessary over/underflow (see Section 2.7 of Basic Linear Algebra Subprograms Technical (BLAST) Forum (2001)).

8 Parallelism and Performance

F16DLF is not threaded in any implementation.

9 Further Comments

None.

10 Example

This example computes the sum of the elements of

$$x = (1, 10, 11, -2, 9)^T.$$

10.1 Program Text

```

Program f16dlfe

!      F16DLF Example Program Text

!      Mark 26 Release. NAG Copyright 2016.

!      .. Use Statements ..
      Use nag_library, Only: f16dlf
!      .. Implicit None Statement ..
      Implicit None
!      .. Parameters ..
      Integer, Parameter          :: nin = 5, nout = 6
!      .. Local Scalars ..
      Integer                     :: i, incx, ix, n, sumval
!      .. Local Arrays ..
      Integer, Allocatable        :: x(:)
!      .. Intrinsic Procedures ..
      Intrinsic                   :: abs
!      .. Executable Statements ..
      Write (nout,*) 'F16DLF Example Program Results'

!      Skip heading in data file
      Read (nin,*)

      Read (nin,*) n, incx
      Allocate (x(1+(n-1)*abs(incx)))

!      Read the vector x and store forwards or backwards
!      as determined by incx.
      If (incx>0) Then
         ix = 1
      Else
         ix = 1 - (n-1)*incx
      End If

      Do i = 1, n
         Read (nin,*) x(ix)
         ix = ix + incx
      End Do

!      Sum the elements of x

      sumval = f16dlf(n,x,incx)

```

```
      Write (nout,*)  
      Write (nout,99999) sumval  
  
99999 Format (1X,'Sum of elements of x is',I5)  
      End Program f16dlfe
```

10.2 Program Data

```
F16DLF Example Program Data  
  5      1      : n and incx  
  1  
 10  
 11  
 -2  
  9      : Vector x
```

10.3 Program Results

```
F16DLF Example Program Results  
  
Sum of elements of x is    29
```
