NAG Library Routine Document

F16ELF (BLAS_DSUM)

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

F16ELF (BLAS_DSUM) sums the elements of a real vector.

2 Specification

```
FUNCTION F16ELF (N, X, INCX)
REAL (KIND=nag_wp) F16ELF
INTEGER            N, INCX
REAL (KIND=nag_wp) X(1+(N-1)*ABS(INCX))
```

The routine may be called by its BLAST name ***blas_dsum***.

3 Description

F16ELF (BLAS_DSUM) returns the sum

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

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

If N ≤ 0 on entry, F16ELF (BLAS_DSUM) 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 Parameters

1: N – INTEGER *Input*

On entry: n, the number of elements in x.

2: X($1 + (\text{N} - 1) \times |\text{INCX}|$) – REAL (KIND=nag_wp) array *Input*

On entry: the vector x. Element x_i is stored in X($(i-1) \times |\text{INCX}| + 1$), for $i = 1, 2, \ldots, n$.

3: INCX – INTEGER *Input*

On entry: the increment in the subscripts of X between successive elements of x.

Constraint: 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

Not applicable.

9 Further Comments

None.

10 Example

This example computes the sum of the elements of

$$x = (1.1, 10.2, 11.5, -2.7, 9.2)^{\mathrm{T}}.$$

10.1 Program Text

```
    Program f16elfe

!     F16ELF Example Program Text

!     Mark 25 Release. NAG Copyright 2014.

!     .. Use Statements ..
      Use nag_library, Only: blas_dsum, nag_wp
!     .. Implicit None Statement ..
      Implicit None
!     .. Parameters ..
      Integer, Parameter               :: nin = 5, nout = 6
!     .. Local Scalars ..
      Real (Kind=nag_wp)               :: sumval
      Integer                          :: i, incx, n
!     .. Local Arrays ..
      Real (Kind=nag_wp), Allocatable  :: x(:)
!     .. Intrinsic Procedures ..
      Intrinsic                        :: abs
!     .. Executable Statements ..
      Write (nout,*) 'F16ELF Example Program Results'

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

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

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

!     Sum the elements of X

      sumval = blas_dsum(n,x,incx)

      Write (nout,*)
      Write (nout,99999) sumval

99999 Format (1X,'Sum of elements of X is',F9.5)
    End Program f16elfe
```

10.2 Program Data

```
F16ELF Example Program Data
  5   1                                          : N and INCX
  1.1   10.2   11.5   -2.7   9.2                  : Array X
```

10.3 Program Results

```
F16ELF Example Program Results

Sum of elements of X is 29.30000
```