

NAG Library Routine Document

F16GLF (BLAS_ZSUM)

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

F16GLF (BLAS_ZSUM) sums the elements of a complex vector.

2 Specification

```
FUNCTION F16GLF (N, X, INCX)
  COMPLEX (KIND=nag_wp) F16GLF
  INTEGER                N, INCX
  COMPLEX (KIND=nag_wp) X(1+(N-1)*ABS(INCX))
```

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

3 Description

F16GLF (BLAS_ZSUM) returns the sum

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

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

If $N \leq 0$ on entry, F16GLF (BLAS_ZSUM) returns the value $0 + 0i$.

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 + (N – 1) × |INCX|) – COMPLEX (KIND=nag_wp) array *Input*
On entry: the vector x . Element x_i is stored in X(($i - 1$) × |INCX| + 1), for $i = 1, 2, \dots, n$.
- 3: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: INCX ≠ 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 Further Comments

None.

9 Example

This example computes the sum of the elements of

$$x = (1.1 + 10.2i, 11.5 - 2.7i, 9.2)^T.$$

9.1 Program Text

```

Program f16glfe

!      F16GLF Example Program Text

!      Mark 24 Release. NAG Copyright 2012.

!      .. Use Statements ..
Use nag_library, Only: blas_zsum, nag_wp
!      .. Implicit None Statement ..
Implicit None
!      .. Parameters ..
Integer, Parameter          :: nin = 5, nout = 6
!      .. Local Scalars ..
Complex (Kind=nag_wp)      :: sumval
Integer                    :: i, incx, n
!      .. Local Arrays ..
Complex (Kind=nag_wp), Allocatable :: x(:)
!      .. Intrinsic Procedures ..
Intrinsic                  :: abs
!      .. Executable Statements ..
Write (nout,*) 'F16GLF 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_zsum(n,x,incx)

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

99999 Format (1X,'Sum of elements of X is (',F9.5,',',F9.5,')')
End Program f16glfe

```

9.2 Program Data

```

F16GLF Example Program Data
  3      1                                : N and INCX
( 1.1, 10.2) ( 11.5,-2.7) ( 9.2, 0.)   : Array X

```

9.3 Program Results

F16GLF Example Program Results

Sum of elements of X is (21.80000, 7.50000)
