

NAG Library Function Document

nag_isum (f16dlc)

1 Purpose

nag_isum (f16dlc) sums the elements of an integer vector.

2 Specification

```
#include <nag.h>
#include <nagf16.h>
```

```
Integer nag_isum (Integer n, const Integer x[], Integer incx, NagError *fail)
```

3 Description

nag_isum (f16dlc) returns the sum

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

of the elements of an n -element integer vector x .

If $n = 0$ on entry, nag_isum (f16dlc) 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 *Input*
On entry: n , the number of elements in x .
Constraint: $n \geq 0$.
- 2: **x[dim]** – const Integer *Input*
Note: the dimension, dim , of the array **x** must be at least $\max(1, 1 + (n - 1) \times |incx|)$.
On entry: the n -element vector x .
 If $incx > 0$, x_i must be stored in $x[(i - 1) \times incx]$, for $i = 1, 2, \dots, n$.
 If $incx < 0$, x_i must be stored in $x[(n - i) \times |incx|]$, for $i = 1, 2, \dots, n$.
 Intermediate elements of **x** are not referenced. If $n = 0$, **x** is not referenced and may be **NULL**.
- 3: **incx** – Integer *Input*
On entry: the increment in the subscripts of **x** between successive elements of x .
Constraint: $incx \neq 0$.
- 4: **fail** – NagError * *Input/Output*
 The NAG error argument (see Section 2.7 in How to Use the NAG Library and its Documentation).

6 Error Indicators and Warnings

NE_ALLOC_FAIL

Dynamic memory allocation failed.

See Section 2.3.1.2 in How to Use the NAG Library and its Documentation for further information.

NE_BAD_PARAM

On entry, argument $\langle value \rangle$ had an illegal value.

NE_INT

On entry, $incx = \langle value \rangle$.

Constraint: $incx \neq 0$.

On entry, $n = \langle value \rangle$.

Constraint: $n \geq 0$.

NE_INTERNAL_ERROR

An unexpected error has been triggered by this function. Please contact NAG.

See Section 2.7.6 in How to Use the NAG Library and its Documentation for further information.

NE_NO_LICENCE

Your licence key may have expired or may not have been installed correctly.

See Section 2.7.5 in How to Use the NAG Library and its Documentation for further information.

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

nag_isum (f16dlc) 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

```
/* nag_isum (f16dlc) Example Program.
 *
 * NAGPRODCODE Version.
 *
 * Copyright 2016 Numerical Algorithms Group.
 *
 * Mark 26, 2016.
 */

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

```

#include <nagf16.h>

int main(void)
{
    /* Scalars */
    Integer exit_status, i, incx, ix, n, sumval;
    /* Arrays */
    Integer *x = 0;
    /* Nag Types */
    NagError fail;

    exit_status = 0;
    INIT_FAIL(fail);

    printf("nag_isum (f16dlc) Example Program Results\n\n");

    /* Skip heading in data file */
#ifdef _WIN32
    scanf_s("%*[\n] ");
#else
    scanf("%*[\n] ");
#endif
    /* Read the number of elements and the increment */
#ifdef _WIN32
    scanf_s("%" NAG_IFMT "%" NAG_IFMT "%*[\n] ", &n, &incx);
#else
    scanf("%" NAG_IFMT "%" NAG_IFMT "%*[\n] ", &n, &incx);
#endif

    if (n > 0) {
        /* Allocate memory */
        if (!(x = NAG_ALLOC(MAX(1, 1 + (n - 1) * ABS(incx)), Integer)))
        {
            printf("Allocation failure\n");
            exit_status = -1;
            goto END;
        }
    }
    else {
        printf("Invalid n\n");
        exit_status = 1;
        goto END;
    }

    /* Read the vector x and store forwards or backwards
     * as determined by incx. */
    for (i = 0, ix = (incx > 0 ? 0 : (1-n)*incx); i < n; i++, ix += incx)
#ifdef _WIN32
        scanf_s("%" NAG_IFMT "", &x[ix]);
#else
        scanf("%" NAG_IFMT "", &x[ix]);
#endif
    /* Read the vector x and store forwards or backwards
     * as determined by incx. */
#ifdef _WIN32
    scanf_s("%*[\n] ");
#else
    scanf("%*[\n] ");
#endif

    /* nag_isum (f16dlc).
     * Sum elements of an Integer vector */
    sumval = nag_isum(n, x, incx, &fail);

    if (fail.code != NE_NOERROR) {
        printf("Error from nag_isum (f16dlc).\n%s\n", fail.message);
        exit_status = 1;
        goto END;
    }

    /* Print the sum */
    printf("Sum of elements of x is %5" NAG_IFMT "\n", sumval);
}

```

10.2 Program Data

```
: n and incx
: Vector x
```

```
Sum of elements of x is      29
```