

# NAG Library Function Document

## nag\_quad\_opt\_set (d01zkc)

### 1 Purpose

nag\_quad\_opt\_set (d01zkc) either initializes or resets the optional argument arrays or sets a single optional argument for supported problem solving functions in Chapter d01.

### 2 Specification

```
#include <nag.h>
#include <nagd01.h>

void nag_quad_opt_set (const char *optstr, Integer iopts[], Integer liopts,
                      double opts[], Integer lopts, NagError *fail)
```

### 3 Description

nag\_quad\_opt\_set (d01zkc) has three purposes: to initialize optional argument arrays; to reset all optional arguments to their default values; or to set a single optional argument to a user-supplied value.

Optional arguments and their values are, in general, presented as a character string, **optstr**, of the form '*option = optval*'; alphabetic characters can be supplied in either upper or lower case. Both *option* and *optval* may consist of one or more tokens separated by white space. The tokens that comprise *optval* will normally be either an integer, real or character value as defined in the description of the specific optional argument. In addition all optional arguments can take an *optval* DEFAULT which resets the optional argument to its default value.

It is imperative that optional argument arrays are initialized before any options are set, before the relevant problem solving function is called and before any options are queried using nag\_quad\_opt\_get (d01zlc). To initialize the optional argument arrays **iopts** and **opts** for a specific problem solving function, the option **Initialize** is used with *optval* identifying the problem solving function to be called, via its short name. For example, to initialize the optional argument arrays to be passed to nag\_quad\_ld\_gen\_vec\_multi\_rcomm (d01rac) and its associated function nag\_quad\_ld\_gen\_vec\_multi\_dimreq (d01rcc), nag\_quad\_opt\_set (d01zkc) is called as follows:

```
nag_quad_opt_set("Initialize = d01rac", iopts, liopts, opts, lopts, &fail)
```

The available option names and their corresponding valid values are given in Section 11 in nag\_quad\_md\_sgq\_multi\_vec (d01esc) and nag\_quad\_ld\_gen\_vec\_multi\_rcomm (d01rac).

### 4 References

None.

## 5 Arguments

- 1: **optstr** – const char \* *Input*  
*On entry:* a string identifying the option to be set.  
**Initialize** = *function name*  
 Initialize the optional argument arrays **iopts** and **opts** for use with function *function name*, where *function name* is the short name associated with the function of interest.  
**Defaults**  
 Resets all options to their default values.  
*option* = *optval*  
 See Section 11 in nag\_quad\_md\_sgq\_multi\_vec (d01esc) and nag\_quad\_ld\_gen\_vec\_multi\_rcomm (d01rac) for details of valid values for *option* and *optval*. The equals sign (=) delimiter must be used to separate the *option* from its *optval* value.  
**optstr** is case insensitive. Each token in the *option* and *optval* component must be separated by at least one space.
- 2: **iopts**[**liopts**] – Integer *Communication Array*  
*On entry:* optional argument array.  
 If **optstr** has the form **Initialize** = *function name*, the contents of **iopts** need not be set.  
 Otherwise, **iopts** MUST NOT have been altered since the last call to nag\_quad\_opt\_set (d01zkc), nag\_quad\_opt\_get (d01zlc) or the selected problem solving function.  
*On exit:* dependent on the contents of **optstr**, either an initialized, reset or updated version of the optional argument array.
- 3: **liopts** – Integer *Input*  
*On entry:* the length of the array **iopts**.  
*Constraint:* unless otherwise stated in the documentation for a specific, supported, problem solving function, **liopts**  $\geq$  100.
- 4: **opts**[**lopts**] – double *Communication Array*  
*On entry:* optional argument array.  
 If **optstr** has the form **Initialize** = *function name*, the contents of **opts** need not be set.  
 Otherwise, **opts** MUST NOT have been altered since the last call to nag\_quad\_opt\_set (d01zkc), nag\_quad\_opt\_get (d01zlc) or the selected problem solving function.  
*On exit:* dependent on the contents of **optstr**, either an initialized, reset or updated version of the optional argument array.
- 5: **lopts** – Integer *Input*  
*On entry:* the length of the array **opts**.  
*Constraint:* unless otherwise stated in the documentation for a specific, supported, problem solving function, **lopts**  $\geq$  100.
- 6: **fail** – NagError \* *Input/Output*  
 The NAG error argument (see Section 3.6 in the Essential Introduction).

## 6 Error Indicators and Warnings

### NE\_ALLOC\_FAIL

Dynamic memory allocation failed.  
See Section 3.2.1.2 in the Essential Introduction for further information.

### NE\_BAD\_PARAM

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

### NE\_INT

On entry, **liopts** =  $\langle value \rangle$ .  
Constraint: **liopts**  $\geq \langle value \rangle$ .

On entry, **lopts** =  $\langle value \rangle$ .  
Constraint: **lopts**  $\geq \langle value \rangle$ .

### NE\_INTERNAL\_ERROR

An internal error has occurred in this function. Check the function call and any array sizes. If the call is correct then please contact NAG for assistance.

An unexpected error has been triggered by this function. Please contact NAG.  
See Section 3.6.6 in the Essential Introduction for further information.

### NE\_INVALID\_FORMAT

On entry, could not convert the specified *optval* to an integer: **optstr** =  $\langle value \rangle$ .

On entry, could not convert the specified *optval* to a real: **optstr** =  $\langle value \rangle$ .

On entry, the expected delimiter '=' was not found in **optstr**: **optstr** =  $\langle value \rangle$ .

### NE\_INVALID\_OPTION

On entry, either the option arrays have not been initialized or they have been corrupted.

On entry, the optional argument in **optstr** was not recognized: **optstr** =  $\langle value \rangle$ .

### NE\_INVALID\_VALUE

On entry, the *optval* supplied for the character optional argument is not valid.  
**optstr** =  $\langle value \rangle$ .

On entry, the *optval* supplied for the integer optional argument is not valid.  
**optstr** =  $\langle value \rangle$ .

On entry, the *optval* supplied for the real optional argument is not valid.  
**optstr** =  $\langle value \rangle$ .

### NE\_NO\_LICENCE

Your licence key may have expired or may not have been installed correctly.  
See Section 3.6.5 in the Essential Introduction for further information.

### NE\_NOT\_FUN\_NAME

On entry, attempting to initialize the optional argument arrays but specified function name was not valid: name =  $\langle value \rangle$ .

## 7 Accuracy

Not applicable.

## 8 Parallelism and Performance

nag\_quad\_opt\_set (d01zkc) is threaded by NAG for parallel execution in multithreaded implementations of the NAG Library.

Please consult the X06 Chapter Introduction for information on how to control and interrogate the OpenMP environment used within this function. Please also consult the Users' Note for your implementation for any additional implementation-specific information.

## 9 Further Comments

For suites of functions that share the same option arrays, the option arrays must be initialized using the primary (driver) function name. For example for functions nag\_quad\_1d\_gen\_vec\_multi\_rcomm (d01rac) and nag\_quad\_1d\_gen\_vec\_multi\_dimreq (d01rcc), the option arrays must be initialized for nag\_quad\_1d\_gen\_vec\_multi\_rcomm (d01rac).

When encoding integer valued options in **optstr**, the integer *optval* must be written as an explicit integer. For example, "Maximum Subdivisions = 12" is acceptable, whereas "Maximum Subdivisions = 12.0" and "Maximum Subdivisions = 0.12e2" are not.

When encoding real valued options in **optstr**, the *optval* may be integral if appropriate. For example, "Absolute Tolerance = 10", "Absolute Tolerance = 10.0" and "Absolute Tolerance = 1.0e1" are all acceptable.

## 10 Example

See the example programs associated with the problem solving function you wish to use for a demonstration of how to use nag\_quad\_opt\_set (d01zkc) to initialize option arrays and set options.

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