

NAG Library Routine Document

E05ZKF

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

E05ZKF either initializes or resets the optional parameter arrays or sets a single optional parameter for supported problem solving routines in Chapter E05. The following routines are supported:

E05SAF,
E05SBF,
E05UCF,
E05USF.

2 Specification

```
SUBROUTINE E05ZKF (OPTSTR, IOPTS, LIOPTS, OPTS, LOPTS, IFAIL)
INTEGER          IOPTS(LIOPTS), LIOPTS, LOPTS, IFAIL
REAL (KIND=nag_wp) OPTS(LOPTS)
CHARACTER(*)     OPTSTR
```

3 Description

E05ZKF has three purposes: to initialize optional parameter arrays; to reset all optional parameters to their default values; or to set a single optional parameter to a user-supplied value.

Optional parameters 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 parameters can take an *optval* DEFAULT which resets the optional parameter to its default value.

It is imperative that optional parameter arrays are initialized before any options are set, before the relevant problem solving routine is called and before any options are queried using E05ZLF. To initialize the optional parameter arrays IOPTS and OPTS for a specific problem solving routine, the option **Initialize** is used with *optval* identifying the problem solving routine to be called, via its short name. For example, to initialize optional parameter arrays to be passed to E05SAF, E05ZKF is called as follows:

```
call E05ZKF('Initialize = e05saf', IOPTS, LIOPTS, OPTS, LOPTS, IFAIL)
```

Information relating to available option names and their corresponding valid values is given in Section 12 in E05SAF, E05SBF, E05UCF and E05USF.

4 References

None.

5 Arguments

- 1: OPTSTR – CHARACTER(*) *Input*
On entry: a string identifying the option to be set.
Initialize = *routine name*
 Initialize the optional parameter arrays IOPTS and OPTS for use with routine *routine name*, where *routine name* is the short name associated with the routine of interest.
Defaults
 Resets all options to their default values.
option = *optval*
 See Section 12 in E05SAF, E05SBF, E05UCF and E05USF 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 array *Communication Array*
On entry: optional parameter array.
 If OPTSTR has the form **Initialize** = *routine name*, the contents of IOPTS need not be set.
 Otherwise, IOPTS **must not** have been altered since the last call to E05ZKF, E05ZLF or the selected problem solving routine.
On exit: dependent on the contents of OPTSTR, either an initialized, reset or updated version of the optional parameter 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 routine, $LIOPTS \geq 100$.
- 4: OPTS(LOPTS) – REAL (KIND=nag_wp) array *Communication Array*
On entry: optional parameter array.
 If OPTSTR has the form **Initialize** = *routine name*, the contents of OPTS need not be set.
 Otherwise, OPTS **must not** have been altered since the last call to E05ZKF, E05ZLF or the selected problem solving routine.
On exit: dependent on the contents of OPTSTR, either an initialized, reset or updated version of the optional parameter 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 routine, $LOPTS \geq 100$.
- 6: IFAIL – INTEGER *Input/Output*
On entry: IFAIL must be set to 0, -1 or 1. If you are unfamiliar with this argument you should refer to Section 3.4 in How to Use the NAG Library and its Documentation for details.
 For environments where it might be inappropriate to halt program execution when an error is detected, the value -1 or 1 is recommended. If the output of error messages is undesirable, then the value 1 is recommended. Otherwise, if you are not familiar with this argument, the

recommended value is 0. **When the value -1 or 1 is used it is essential to test the value of IFAIL on exit.**

On exit: IFAIL = 0 unless the routine detects an error or a warning has been flagged (see Section 6).

6 Error Indicators and Warnings

If on entry IFAIL = 0 or -1 , explanatory error messages are output on the current error message unit (as defined by X04AAF).

Errors or warnings detected by the routine:

IFAIL = 11

On entry, the optional parameter in OPTSTR was not recognized: OPTSTR = $\langle value \rangle$.

IFAIL = 12

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

IFAIL = 13

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 = $\langle value \rangle$.

The *option* in OPTSTR is associated with a numerical value. However, the *optval*, $\langle value \rangle$, present in OPTSTR could not be fully interpreted.

IFAIL = 14

On entry, the *option* in OPTSTR has been detected as **Initialize**, however the *optval*, $\langle value \rangle$, associated with OPTSTR has not been recognized as a valid routine name.

IFAIL = 15

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

IFAIL = 16

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

IFAIL = 17

On entry, the optional parameter in OPTSTR was not recognized: OPTSTR = $\langle value \rangle$.

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

IFAIL = 21

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

On entry, the optional parameter in OPTSTR was not recognized: OPTSTR = $\langle value \rangle$.

IFAIL = 31

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

IFAIL = 51

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

IFAIL = -99

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

See Section 3.9 in How to Use the NAG Library and its Documentation for further information.

IFAIL = -399

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

See Section 3.8 in How to Use the NAG Library and its Documentation for further information.

IFAIL = -999

Dynamic memory allocation failed.

See Section 3.7 in How to Use the NAG Library and its Documentation for further information.

7 Accuracy

Not applicable.

8 Parallelism and Performance

E05ZKF 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 routine. Please also consult the Users' Note for your implementation for any additional implementation-specific information.

9 Further Comments

Some options have default values which are problem dependent. For example the option **Maximum Iterations Completed** for E05SAF has the default value $1000 \times \text{NDIM}$. If options such as this are set, they may only be set to constant values. If such an option is reset to its DEFAULT value its dependence on the specific problem will be restored.

10 Example

See the example programs associated with the problem solving routine you wish to use for a demonstration of how to use E05ZKF to initialize option arrays and set options.
