# NAG Toolbox for MATLAB

# e04wb

## 1 Purpose

e04wb is used to initialize functions e04dg, e04mf, e04nc, e04nf, e04nk, e04uc, e04uf, e04ug and e04us.

## 2 Syntax

```
[cwsav, lwsav, iwsav, rwsav, ifail] = e04wb(routine)
```

## 3 Description

e04wb initializes some or all of the arrays **cwsav**, **lwsav**, **iwsav** and **rwsav** for the function specified by **routine**, and any associated option setting functions.

## 4 References

None.

## 5 Parameters

### 5.1 Compulsory Input Parameters

1: **routine – string**

The name of the function to be initialized.

*Constraint*: **routine** must be a valid function name.

### 5.2 Optional Input Parameters

None.

### 5.3 Input Parameters Omitted from the MATLAB Interface

lcwsav, llwsav, liwsav, lrwsav

### 5.4 Output Parameters

1: **cwsav**(**lcwsav**) **– string array**

2: **lwsav**(**llwsav**) **– logical array**

3: **iwsav**(**liwsav**) **– int32 array**

4: **rwsav**(**lrwsav**) **– double array**

5: **ifail – int32 scalar**

0 unless the function detects an error (see Section 6).

## 6 Error Indicators and Warnings

Errors or warnings detected by the function:

**ifail** $= 1$

The function name supplied in **routine** is invalid

**ifail** $= 2$

One or more of the workspace array lengths **lcwsav**, **llwsav**, **liwsav** or **lrwsav** is too small.

## 7 Accuracy

Not applicable.

## 8 Further Comments

The time taken by e04wb is negligible.

## 9 Example

e04dg_objfun.m

```
function [mode, objf, objgrd, user] = e04dg_objfun(mode, n, x, nstate,
user)

      expx1 = exp(x(1));
      objf = expx1*(4.0*x(1)^2+2.0*x(2)^2+4.0*x(1)*x(2)+2.0*x(2)+1.0);
      if (mode == 2)
         objgrd(1) = 4.0*expx1*(2.0*x(1)+x(2)) + objf;
         objgrd(2) = 2.0*expx1*(2.0*x(2)+2.0*x(1)+1.0);
      else
         objgrd = zeros(2,1);
      end
```

```
x = [-1;
     1];
[cwsav,lwsav,iwsav,rwsav,ifail] = e04wb('e04dg');
[iter, objf, objgrd, xOut, user, lwsavOut, iwsavOut, rwsavOut, ifail] =
...
    e04dg('e04dg_objfun', x, lwsav, iwsav, rwsav)
```

```
iter =
          10
objf =
   5.3083e-14
objgrd =
   1.0e-06 *
    0.9125
    0.8316
xOut =
    0.5000
   -1.0000
user =
     0
lwsavOut =
     array elided
iwsavOut =
     array elided
rwsavOut =
     array elided
```

```
ifail =
           0
```