

Module 1.5: nag_math_constants

Mathematical Constants

`nag_math_constants` provides approximations to the mathematical constants π and γ as functions.

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Procedure: nag_pi

1 Description

`nag_pi` returns an approximation to the mathematical constant π in the precision specified by the kind type parameter of the argument `x`.

2 Usage

```
USE nag_math_constants
```

```
[value =] nag_pi(x)
```

The function result is a scalar of type `real(kind=wp)`.

3 Arguments

3.1 Mandatory Argument

`x` — `real(kind=wp)`, intent(in)

Input: this argument is used to define the kind type parameter of the result.

Note: the value of `x` is not used.

4 Error Codes

None.

5 Examples of Usage

A complete example of the use of this procedure appears in Example 1 of this module document.

Procedure: nag_euler_constant

1 Description

`nag_euler_constant` returns an approximation to the mathematical constant γ in the precision specified by the kind type parameter of the argument `x`.

2 Usage

```
USE nag_math_constants
```

```
[value =] nag_euler_constant(x)
```

The function result is a scalar of type `real(kind=wp)`.

3 Arguments

3.1 Mandatory Argument

`x` — `real(kind=wp)`, intent(in)

Input: this argument is used to define the kind type parameter of the result.

Note: the value of `x` is not used.

4 Error Codes

None.

5 Examples of Usage

A complete example of the use of this procedure appears in Example 1 of this module document.

Example 1: Evaluation of the Mathematical Constants π and γ

This example prints out the approximated values of π and γ with the same kind type parameter as 1.0_wp.

1 Program Text

Note. The listing of the example program presented below is double precision. Single precision users are referred to Section 5.2 of the Essential Introduction for further information.

```

PROGRAM nag_math_constants_ex01

! Example Program Text for nag_math_constants
! NAG f190, Release 3. NAG Copyright 1997.

! .. Use Statements ..
USE nag_examples_io, ONLY : nag_std_out
USE nag_math_constants, ONLY : nag_pi, nag_euler_constant
! .. Implicit None Statement ..
IMPLICIT NONE
! .. Intrinsic Functions ..
INTRINSIC KIND
! .. Parameters ..
INTEGER, PARAMETER :: wp = KIND(1.0D0)
! .. Local Scalars ..
REAL (wp) :: x
! .. Executable Statements ..

WRITE (nag_std_out,*) &
'Example Program Results for nag_math_constants_ex01'

WRITE (nag_std_out,*)

x = 1.0_wp

WRITE (nag_std_out,'(1x,a,f18.14)') 'nag_pi           =', nag_pi(x)
WRITE (nag_std_out,'(1x,a,f18.14)') 'nag_euler_constant =', &
nag_euler_constant(x)

END PROGRAM nag_math_constants_ex01

```

2 Program Data

None.

3 Program Results

Example Program Results for nag_math_constants_ex01

```

nag_pi           = 3.14159265358979
nag_euler_constant = 0.57721566490153

```