
NAME

machconst - Fortran Fortran callable library for machine constants

DESCRIPTION

machconst provides Fortran callable routines to return information about the "machine constants" for a platform. It is based upon the C routines included in the *d1mach.f*, *i1mach.f* and *r1mach.f* files available from Netlib (<http://www.netlib.org>).

FUNCTIONS

machconst provides three functions, `d1mach`, `i1mach`, and `r1mach` each of which is passed a single integer argument which indicates which value is to be returned.

Double-Precision Machine Constants

`D1MACH(1) = B**(EMIN-1)` the smallest positive magnitude.

`D1MACH(2) = B**EMAX*(1 - B**(-T))` the largest magnitude.

`D1MACH(3) = B**(-T)` the smallest relative spacing.

`D1MACH(4) = B**(1-T)` the largest relative spacing.

`D1MACH(5) = LOG10(B)`

I/O Unit Numbers

`I1MACH(1) =` the standard input unit.

`I1MACH(2) =` the standard output unit.

`I1MACH(3) =` the standard punch unit.

`I1MACH(4) =` the standard error message unit.

Words

`I1MACH(5) =` the number of bits per integer storage unit.

`I1MACH(6) =` The number of characters per character storage unit.
For fortran 77, this is always 1. For fortran 66,
character storage unit = integer storage unit.

Integers

Assume integers are represented in the s-digit, base-a form

$$\text{SIGN} (X(S-1)*A^{(S-1)} + \dots + X(1)*A + X(0))$$

where $0 < X(l) < A$ for $l=0,\dots,S-1$.

`I1MACH(7) = A`, the base.

I1MACH(8) = S, the number of base-a digits.

I1MACH(9) = A**S - 1, the largest magnitude.

Floating-Point Numbers

Assume floating-point numbers are represented in the t-digit, base-b form

$\text{SIGN } (B^{**E}) * ((X(1)/B) + \dots + (X(T)/B^{**T}))$

where

$0 < X(I) < B$ for $I=1, \dots, T$,
 $0 < X(1)$, and $\text{EMIN} \leq E \leq \text{EMAX}$.

I1MACH(10) = B, THE BASE.

Single-Precision

I1MACH(11) = T, the number of base-b digits.

I1MACH(12) = EMIN, the smallest exponent e.

I1MACH(13) = EMAX, the largest exponent e.

Double-Precision

I1MACH(14) = T, the number of base-b digits.

I1MACH(15) = EMIN, the smallest exponent e.

I1MACH(16) = EMAX, the largest exponent e.

Single-Precision Machine Constants

R1MACH(1) = $B^{*(\text{EMIN}-1)}$, the smallest positive magnitude.

R1MACH(2) = $B^{*\text{EMAX}*(1 - B^{*(-T)})}$, the largest magnitude.

R1MACH(3) = $B^{*(-T)}$, the smallest relative spacing.

R1MACH(4) = $B^{*(1-T)}$, the largest relative spacing.

R1MACH(5) = LOG10(B)

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AUTHOR

Various