Title

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mindouble( ) — Minimum and maximum nonmissing value

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Description

`mindouble()` returns the largest negative, nonmissing value.

`maxdouble()` returns the largest positive, nonmissing value.

`smallestdouble()` returns the smallest full-precision value of e, $e > 0$. The largest full-precision value of e, $e < 0$ is $-$`smallestdouble()`.

Syntax

real scalar `mindouble()`

real scalar `maxdouble()`

real scalar `smallestdouble()`

Remarks and examples

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All nonmissing values x fulfill `mindouble()` $\leq x \leq$ `maxdouble()`.

All missing values m fulfill $m >$ `maxdouble()`

Missing values also fulfill $m \geq$ `.`

On all computers on which Stata and Mata are currently implemented, which are computers following IEEE standards:

Function	Exact hexadecimal value	Approximate decimal value
`mindouble()`	`-1.fffffffffffffX+3ff`	−1.7977e+308
`smallestdouble()`	`+1.0000000000000X-3fe`	2.2251e–308
`epsilon(1)`	`+1.0000000000000X-034`	2.2205e–016
`maxdouble()`	`+1.fffffffffffffX+3fe`	8.9885e+307

The smallest missing value (`.` < `.a` < ··· < `.z`) is `+1.0000000000000X+3ff`.

Do not confuse `smallestdouble()` with the more interesting value `epsilon(1)`. `smallestdouble()` is the smallest full-precision value of e, $e > 0$. `epsilon(1)` is the smallest value of e, e+1 > 1; see [M-5] **epsilon( )**.

Conformability

`mindouble()`, `maxdouble()`, `smallestdouble()`:
result: 1×1

Diagnostics

None.

Reference

Linhart, J. M. 2008. Mata Matters: Overflow, underflow and the IEEE floating-point format. *Stata Journal* 8: 255–268.

Also see

[M-5] **epsilon( )** — Unit roundoff error (machine precision)

[M-4] **Utility** — Matrix utility functions