Title

exp( ) — Exponentiation and logarithms

Syntax Description Conformability Diagnostics Also see

Syntax

numeric matrix `exp(`*numeric matrix Z*`)`

numeric matrix `ln(`*numeric matrix Z*`)`

numeric matrix `log(`*numeric matrix Z*`)`

numeric matrix `log10(`*numeric matrix Z*`)`

Description

`exp(`Z`)` returns the elementwise exponentiation of Z. `exp()` returns real if Z is real and complex if Z is complex.

`ln(`Z`)` and `log(`Z`)` return the elementwise natural logarithm of Z. The functions are synonyms. `ln()` and `log()` return real if Z is real and complex if Z is complex.

`ln(`x`)`, x real, returns the natural logarithm of x or returns missing (`.`) if $x \leq 0$.

`ln(`z`)`, z complex, returns the complex natural logarithm of z. $\text{Im}(\ln(\,))$ is chosen to be in the interval $[-pi, pi]$.

`log10(`Z`)` returns the elementwise log base 10 of Z. `log10()` returns real if Z is real and complex if Z is complex. `log10(`Z`)` is defined mathematically and operationally as `ln(`Z`)/ln(10)`.

Conformability

`exp(`Z`)`, `ln(`Z`)`, `log(`Z`)`, `log10(`Z`)`:

Z:	$r \times c$
result:	$r \times c$

Diagnostics

`exp(`Z`)` returns missing when $\text{Re}(Z) > 709$.

`ln(`Z`)`, `log(`Z`)`, and `log10(`Z`)` return missing when Z is real and $Z \leq 0$. In addition, the functions return missing (`.`) for real arguments when the result would be complex. For instance, `ln(-1)` = `.`, whereas `ln(-1+0i)` = $3.14159265i$.

Also see

[M-4] **scalar** — Scalar mathematical functions