**op_arith — Arithmetic operators**

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**Description**

The above operators perform basic arithmetic.

**Syntax**

```
    a + b   addition
    a - b   subtraction
    a * b   multiplication
    a / b   division
    a ^ b   power
    -a      negation
```

where `a` and `b` may be numeric scalars, vectors, or matrices.

**Remarks and examples**

Also see [M-2] `op_colon` for the :+, :-, :*, and :/ operators. Colon operators have relaxed conformability restrictions.

The * and :* multiplication operators can also perform string duplication—3*a" = "aaa"—see [M-5] `strdup()`.

**Conformability**

```
    a + b, a - b:
      a:   r × c
      b:   r × c
    result: r × c

    a * b:
      a:   k × n  k × n  1 × 1
      b:   n × m  1 × 1  n × m
    result: k × m  k × n  n × m

    a / b:
      a:   r × c
      b:   1 × 1
    result: r × c

    a ^ b:
      a:   1 × 1
      b:   1 × 1
    result: 1 × 1
```
\[-a: \quad a: \quad r \times c \]
\[\text{result:} \quad r \times c\]

**Diagnostics**

All operators return missing when arguments are missing.

\[a*b\] with \(a: k \times 0\) and \(b: 0 \times m\) returns a \(k \times m\) matrix of zeros.

\[a/b\] returns missing when \(b==0\) or when \(a/b\) would result in overflow.

\[a^b\] returns a real when both \(a\) and \(b\) are real; thus, \((-4)^{.5}\) evaluates to missing, whereas \((-4+0i)^{.5}\) evaluates to \(2i\).

\[a^b\] returns missing on overflow.

**Also see**

[M-2] exp — Expressions

[M-2] Intro — Language definition