NAME

atan2, atan2f, atan2l — arc tangent functions

SYNOPSIS

```
#include <math.h>

double atan2(double y, double x);
float atan2f(float y, float x);
long double atan2l(long double y, long double x);
```

DESCRIPTION

The functionality described on this reference page is aligned with the ISO C standard. Any conflict between the requirements described here and the ISO C standard is unintentional. This volume of POSIX.1-2024 defers to the ISO C standard.

These functions shall compute the principal value of the arc tangent of *y*/*x*, using the signs of both arguments to determine the quadrant of the return value.

An application wishing to check for error situations should set *errno* to zero and call *feclearexcept*(FE_ALL_EXCEPT) before calling these functions. On return, if *errno* is non-zero or *fetestexcept*(FE_INVALID | FE_DIVBYZERO | FE_OVERFLOW | FE_UNDERFLOW) is non-zero, an error has occurred.

RETURN VALUE

Upon successful completion, these functions shall return the arc tangent of *y*/*x* in the range [-π,π] radians.

If *y* is +/-0 and *x* is < 0, +/-π shall be returned.

If *y* is +/-0 and *x* is > 0, +/-0 shall be returned.

If *y* is < 0 and *x* is +/-0, -π/2 shall be returned.

If *y* is > 0 and *x* is +/-0, π/2 shall be returned.

If *x* is 0, a pole error shall not occur.

If either *x* or *y* is NaN, a NaN shall be returned.

If the correct value would cause underflow, a range error may occur, and *atan*(), *atan2f*(), and *atan2l*() shall return an implementation-defined value no greater in magnitude than DBL_MIN, FLT_MIN, and LDBL_MIN, respectively. If the IEC 60559 Floating-Point option is supported, *y*/*x* should be returned.

If *y* is +/-0 and *x* is -0, +/-π shall be returned.

If *y* is +/-0 and *x* is +0, +/-0 shall be returned.

For finite values of +/-*y* > 0, if *x* is -Inf, +/-π shall be returned.

For finite values of +/-*y* > 0, if *x* is +Inf, +/-0 shall be returned.

For finite values of *x*, if *y* is +/-Inf, +/-π/2 shall be returned.

If *y* is +/-Inf and *x* is -Inf, +/-3π/4 shall be returned.

If *y* is +/-Inf and *x* is +Inf, +/-π/4 shall be returned.

If both arguments are 0, a domain error shall not occur.

ERRORS

These functions may fail if:

Range Error

The result underflows.

If the integer expression (*math_errhandling* & MATH_ERRNO) is non-zero, then *errno* shall be set to [ERANGE]. If the integer expression (*math_errhandling* & MATH_ERREXCEPT) is non-zero, then the underflow floating-point exception shall be raised.