

**NAME**

atan2, atan2f, atan2l – arc tangent function of two variables

**LIBRARY**

Math library (*libm*, *-lm*)

**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);
```

Feature Test Macro Requirements for glibc (see **feature\_test\_macros(7)**):

```
atan2f(), atan2l():
```

```
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
```

```
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
```

```
|| /* glibc <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

**DESCRIPTION**

These functions calculate the principal value of the arc tangent of  $y/x$ , using the signs of the two arguments to determine the quadrant of the result.

**RETURN VALUE**

On success, these functions return the principal value of the arc tangent of  $y/x$  in radians; the return value is in the range  $[-\pi, \pi]$ .

If  $y$  is  $+0$  ( $-0$ ) and  $x$  is less than 0,  $+\pi$  ( $-\pi$ ) is returned.

If  $y$  is  $+0$  ( $-0$ ) and  $x$  is greater than 0,  $+0$  ( $-0$ ) is returned.

If  $y$  is less than 0 and  $x$  is  $+0$  or  $-0$ ,  $-\pi/2$  is returned.

If  $y$  is greater than 0 and  $x$  is  $+0$  or  $-0$ ,  $\pi/2$  is returned.

If either  $x$  or  $y$  is NaN, a NaN is returned.

If  $y$  is  $+0$  ( $-0$ ) and  $x$  is  $-0$ ,  $+\pi$  ( $-\pi$ ) is returned.

If  $y$  is  $+0$  ( $-0$ ) and  $x$  is  $+0$ ,  $+0$  ( $-0$ ) is returned.

If  $y$  is a finite value greater (less) than 0, and  $x$  is negative infinity,  $+\pi$  ( $-\pi$ ) is returned.

If  $y$  is a finite value greater (less) than 0, and  $x$  is positive infinity,  $+0$  ( $-0$ ) is returned.

If  $y$  is positive infinity (negative infinity), and  $x$  is finite,  $\pi/2$  ( $-\pi/2$ ) is returned.

If  $y$  is positive infinity (negative infinity) and  $x$  is negative infinity,  $+3\pi/4$  ( $-3\pi/4$ ) is returned.

If  $y$  is positive infinity (negative infinity) and  $x$  is positive infinity,  $+\pi/4$  ( $-\pi/4$ ) is returned.

**ERRORS**

No errors occur.

**ATTRIBUTES**

For an explanation of the terms used in this section, see **attributes(7)**.

| Interface                                          | Attribute     | Value   |
|----------------------------------------------------|---------------|---------|
| <b>atan2()</b> , <b>atan2f()</b> , <b>atan2l()</b> | Thread safety | MT-Safe |

**STANDARDS**

C11, POSIX.1-2008.

**HISTORY**

C99, POSIX.1-2001.

The variant returning *double* also conforms to SVr4, 4.3BSD, C89.

**SEE ALSO****acos(3), asin(3), atan(3), carg(3), cos(3), sin(3), tan(3)**