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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'complex.7' command

\$ man complex.7

COMPLEX(7) Linux Programmer's Manual COMPLEX(7)

NAME

complex - basics of complex mathematics

SYNOPSIS

```
#include <complex.h>
```

DESCRIPTION

Complex numbers are numbers of the form $z = a+bi$, where a and b are real numbers and $i = \sqrt{-1}$, so that $i*i = -1$.

There are other ways to represent that number. The pair (a,b) of real numbers may be viewed as a point in the plane, given by X- and Y-coordinates. This same point may also be described by giving the pair of real numbers (r,ϕ) , where r is the distance to the origin O , and ϕ the angle between the X-axis and the line Oz . Now $z = r*\exp(i*\phi) = r*(\cos(\phi)+i*\sin(\phi))$.

The basic operations are defined on $z = a+bi$ and $w = c+di$ as:

addition: $z+w = (a+c) + (b+d)*i$

multiplication: $z*w = (a*c - b*d) + (a*d + b*c)*i$

division: $z/w = ((a*c + b*d)/(c*c + d*d)) + ((b*c - a*d)/(c*c + d*d))*i$

Nearly all math function have a complex counterpart but there are some complex-only functions.

EXAMPLES

Your C-compiler can work with complex numbers if it supports the C99 standard. Link with `-lm`. The imaginary unit is represented by `I`.

```

/* check that exp(i * pi) == -1 */
#include <math.h>    /* for atan */
#include <stdio.h>
#include <complex.h>

int
main(void)
{
    double pi = 4 * atan(1.0);

    double complex z = cexp(I * pi);

    printf("%f + %f * i\n", creal(z), cimag(z));
}

```

SEE ALSO

[cabs\(3\)](#), [cacos\(3\)](#), [cacosh\(3\)](#), [carg\(3\)](#), [casin\(3\)](#), [casinh\(3\)](#), [catan\(3\)](#),
[catanh\(3\)](#), [ccos\(3\)](#), [ccosh\(3\)](#), [cerf\(3\)](#), [cexp\(3\)](#), [cexp2\(3\)](#), [cimag\(3\)](#),
[clog\(3\)](#), [clog10\(3\)](#), [clog2\(3\)](#), [conj\(3\)](#), [cpow\(3\)](#), [cproj\(3\)](#), [creal\(3\)](#),
[csin\(3\)](#), [csinh\(3\)](#), [csqrt\(3\)](#), [ctan\(3\)](#), [ctanh\(3\)](#)

COLOPHON

This page is part of release 5.10 of the Linux man-pages project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at <https://www.kernel.org/doc/man-pages/>.

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