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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'cproj.3p' command

\$ man cproj.3p

CPROJ(3P) POSIX Programmer's Manual CPROJ(3P)

PROLOG

This manual page is part of the POSIX Programmer's Manual. The Linux implementation of this interface may differ (consult the corresponding Linux manual page for details of Linux behavior), or the interface may not be implemented on Linux.

NAME

cproj, cprojf, cprojl ? complex projection functions

SYNOPSIS

```
#include <complex.h>

double complex cproj(double complex z);

float complex cprojf(float complex z);

long double complex cprojl(long double complex z);
```

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?2017 defers to the ISO C standard.

These functions shall compute a projection of z onto the Riemann sphere: z projects to z , except that all complex infinities (even those with one infinite part and one NaN part) project to positive infinity on the real axis. If z has an infinite part, then $cproj(z)$ shall be equivalent to:

INFINITY + I * copysign(0.0, cimag(z))

RETURN VALUE

These functions shall return the value of the projection onto the Riemann sphere.

ERRORS

No errors are defined.

The following sections are informative.

EXAMPLES

None.

APPLICATION USAGE

None.

RATIONALE

Two topologies are commonly used in complex mathematics: the complex plane with its continuum of infinities, and the Riemann sphere with its single infinity. The complex plane is better suited for transcendental functions, the Riemann sphere for algebraic functions. The complex types with their multiplicity of infinities provide a useful (though imperfect) model for the complex plane. The `cproj()` function helps model the Riemann sphere by mapping all infinities to one, and should be used just before any operation, especially comparisons, that might give spurious results for any of the other infinities. Note that a complex value with one infinite part and one NaN part is regarded as an infinity, not a NaN, because if one part is infinite, the complex value is infinite independent of the value of the other part. For the same reason, `cabs()` returns an infinity if its argument has an infinite part and a NaN part.

FUTURE DIRECTIONS

None.

SEE ALSO

`carg()`, `cimag()`, `conj()`, `creal()`

The Base Definitions volume of POSIX.1-2017, `<complex.h>`

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