Proposal for C2Y
WG14 N3536

Title:	Clarify wording of 7.3.9.5 - cproj
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Proposal Category:	Editorial
Reference:	N3550

1. Background Rationale

The suggested changes give a more direct and complete specification for the case where the argument has an infinite part.

The `cproj` functions capture the spirit of the mathematical mapping onto the complex plane extended by a single point at infinity. They perform the simple task of mapping any argument with an infinite part into one of two canonical values that compare equal, mapping any other argument to itself.

The current statements in 7.3.9.5 #2 and #3 about the Riemann sphere are incorrect. The Riemann sphere is a mathematically related topic, which may explain its historical presence in 7.3.9.5, but the Riemann sphere is not the subject of the `cproj` functions. This change removes the references to the Riemann sphere.

This proposal requires no implementation changes.

2. Suggested Changes

7.3.9.5#2 The `cproj` functions

The `cproj` functions ~~compute a projection of z onto the Riemann sphere~~ ~~where 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~~ map z to itself except where z has an infinite real or imaginary part (even if the other part is a NaN) in which case `cproj(z)` is equivalent to

$$\texttt{CMPLX(INFINITY, copysign(0.0, cimag(z)))}$$

$$\texttt{~~INFINITY + I * copysign(0.0, cimag(z))~~}$$

and other functions in the `cproj` family are equivalent to the analogous expressions for their type.

7.3.9.5#3 The `cproj` functions

The `cproj` functions return the value of ~~the projection onto the Riemann sphere~~ their argument unless that argument has an infinite part in which case they return a complex floating value with an infinite real part and a zero imaginary part.