

Proposal for C2Y

WG14 nnnn **(was n3404)**

Title: Improved treatment of error conditions for functions that round result to narrow type
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Proposal category: Editorial
Reference: N3301

This document proposes clarification of the language and unification of the requirements around some errors that arise in functions that perform arithmetic and deliver results to a narrower floating type.

Suggested change:

fadd – change to the last sentence of 7.12.15.2#2

A domain error may occur ~~for infinite arguments~~ if both arguments are infinite and have opposite sign.

fsub – change to the last sentence of 7.12.15.3#2

A domain error may occur ~~for infinite arguments~~ if both arguments are infinite with the same sign or both arguments are infinite and either argument is unsigned.

fmul – change to the last sentence of 7.12.15.4#2

A domain error ~~occurs~~ may occur for one infinite argument and one zero argument.

fdiv – change to the second to the last sentence of 7.12.15.5#2

A domain error ~~occurs~~ may occur for either both arguments infinite or both arguments zero.

fma – change to the last sentence of 7.12.15.6#2

A domain error may occur ~~for an infinite argument~~ if one of x and y is zero and the other is infinite. A domain error may occur if z is infinite and one of x and y is infinite while the other is nonzero finite or infinite, such that the product of x and y has the opposite sign of z.

Rationale:

This change makes explicit which cases may cause domain errors in `fadd`, `fsub`, and `fma`. The case of `fsub` is expanded to include unsigned (projective) infinity, should it be implemented, in the one case of magnitude subtraction of unsigned infinite values.

The change also brings the reporting requirements of all functions in 7.12.15 into harmony by weakening the specification for `fmul`, and `fdiv` from "error occurs" to "error may occur". The alternative suggestion, to strengthen all reporting to "error occurs", could break some existing implementations.

This change requires no implementation changes.