

## WG14 N3527

### Meeting notes

## C Floating Point Study Group Teleconference

2025/03/12: 8 AM PDT / 11 AM DST / 3 PM UTC

### Attendees

Jim Thomas, Rajan Bhakta, Jerome Coonen, Damian McGuckin, Tue Ly, Maryam Karampour, Joshua Cranmer, David Hough, Fred Tydeman

### Agenda plus new items

<https://wiki.edg.com/pub/CFP/WebHome/n3516.pdf> – These minutes should be read alongside the agenda, with its many reference links.

### Previous meeting notes

<https://wiki.edg.com/pub/CFP/WebHome/n3515.pdf>

### Study group logistics

Next meeting: 16 April 2025, 8:00 AM PDT

ISO Zoom teleconference

Please notify the group if this time slot does not work.

David: Has the server attackers at bay, for now.

### C documents

There is a new C2Y draft 3467 Feb 2025. <https://www.open-std.org/jtc1/sc22/wg14/www/docs/n3467.pdf>

C23 has been published ISO/IEC 9899, available for purchase. <https://www.iso.org/standard/82075.html>

Jim: Please note the new draft, a fairly quick update from the previous version.

### IEEE 754 liaison

David & Damian & Jerome: Much discussion but change is slow. A major topic is the fate of the 16-bit floating type.

### C++ liaison

Joshua: Meeting of the numeric subgroup in recent meeting. The move to deprecate the fp environment still on the table.

### WG14

Rajan: All papers but one were accepted. The paper on frexp and type double double has unacceptable language.

WG14 had several ideas but no specific suggestion.

Quoting Rajan from chat: These are models outside the C model. Should be in the library introduction section (7.1.4), "For the functions in math.h, if the implementation does not follow the model in 5.2.5.3.3, the results for the functions will be unspecified."

Jim: Takes new action to offer a proposed fix arrived at in discussion.

Rajan: SIGFPE -- went with Option 4 in Fred's paper, n3378c:

<https://wiki.edg.com/pub/CFP/WebHome/n3378c.htm>.

Rajan: CFP got a round of applause from WG14. (Story told twice by popular demand.) The group is encouraged to proceed in all of the directions discussed in the February meeting.

Rajan: New draft of N3390 coming from Alex Celeste. The issue is whether the imaginary "I" is a constant or macro.

<https://www.open-std.org/jtc1/sc22/wg14/www/docs/n3390.htm>

Jim & Rajan: WG14 is developing a new process for simple wording changes to papers pending approval. This should expedite workflow.

Jim: Is it intended to be possible to support the imaginary types as a "pure extension", that is, not invalidating the implementation?

Rajan: Yes

Jim: Can the current specification for imaginary types be preserved? What about the imaginary suffix?

Rajan: The imaginary suffix is part of the standard, so the new interpretation would be a change to the standard.

Jim & Damian: The crux of the matter is how to express "1.0i" as a pure imaginary unit when the standard defines it as a complex value with a possibly troublesome signed real part.

#### **TS-4 and TS-5 revisions**

Jim: Links in the agenda lead to drafts with a banner showing that final updates are due to be published "soon".

#### **Carry-over action items from last meeting**

Damian: complex.h intro, cproj, and editorial suggestions.

Damian: Might have a paper on the complex.h Intro up next week. cproj is done.

#### **Action items from last meeting**

David: Draft statement on midpoint and interpolation.

David: Done and forwarded by Rajan to WG14, where it was accepted.

Ly (spontaneous item): Will the complex library ever match the real library? E.g. cube root or sinpi?

Jim: This will be considered for future discussion.

Jim: Review the comments on TS 5.

Done, with suggestions accepted by ISO, so they will appear.

Jerome: Rework the proposal for functions rounding to a narrow type. Finish by 19 Feb for Rajan to take to WG14 meeting.

Done and passed.

Jim: Write a paper proposing editorial changes for imaginary suffix, emphasizing editorial changes vs. technical changes.

Done as WG14 paper n3500, due for next meeting.

#### **Discussion of issues**

Action item from WG14

Rajan: N3447 deals with evaluation of constants at compile time, outside the execution environment.

Jim: Proposes better wording for the description, and Rajan takes an action.

Midpoint and interpolation functions in C

Rajan: WG14 is happy with David's reply.

cproj cleanup

Jim: All of the other complex functions are defined generally across the family. But cproj has a definition in terms of type double. An added sentence makes that difference clearer.

Jiim: Offers several comments re. the form of the proposal, with options to prepare in Word, or Google Docs, or elsewhere.

Fred: Process comment -- I do my proposals in raw html.

complex.h introduction

Taken as a carryover action item.

Errors in draft 3435

Jim: Parenthetical about "infinitary" is not yet removed but Rajan says it's in the works.

Imaginary I macro and i suffix issues

Jim: Rajan has proposed fixes and the change is coming.

**Other issues:**

WG 14 proposal process

Jim: Discussed earlier.

nexttoward exceptions

Ly: The issue is raising exceptions for 0 or subnormal results. It's not clear that one or both of ERRNO and the fp exceptions must be indicated if the result is subnormal or zero. Whether it's raised is implementation-defined in the standard. Annex F does not have that latitude.

Ly: In Linux, we don't want to spend the execution time to signal the exception.. Linux has the newer forms nextup and nextdown but they're not generally available in programming environments.

**Adjournment**

9:26 AM PDT

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**Action items to be carried over:**

Damian: complex.h intro and editorial suggestions.

**New action items:**

Jim: Draft a paper with suggestion for frexp and double double to address the WG14 objections.

Rajan: Send a note to WG14 about the N3447 issue.

Damian & Jim: Tune up the cproj proposal suitable for WG14.

Ly: Send email to CFP about the next\_\_\_\_() issues pertaining to the several functions inspired by nextafter().

**Discussion issues to be carried over:**

None.

[Rev. 1 changes: Restore J to JTC in the Subject. Move Damian's complex.h item to carryover. Remove the obsolete C23 Integration section. Upgrade a few phrases. Strengthen Rajan's statement of intent from WG14 (after the applause!).]

Respectfully submitted.

-Jerome Coonen

650.996.4738

[jcoonen@gmail.com](mailto:jcoonen@gmail.com)