

# OpenMath Society 2016 Meeting

JHD/checkers

25,29 July 2016

This is the 29th OpenMath workshop.

MK noted that there was a great deal of use in OpenMath in OpenDreamKit, and also in his group's work. Mostly happy, but there are occasion mumbles.

## 1 Agenda

General discussion. This should include "website" as an item. MK had proposed the Friday (29th) as starting the work, but JHD noted that OpenMath had, unfortunately, a tradition of not getting much done except at CICM, so suggested that we work during the week, and report back on Friday. This was agreed.

Suggested new Committee: MK,JHD, FR, PI, Alex Konovalov. It was asked whether we also needed a Treasurer: the duties had been very light.

**Q–BM** Should we do something about the fact that we're a Finnish society?

**MK/JHD** Not urgently. MS also used to pay for the domain name `openmath.org`, but that's been moved to PL. That was the only payment MS used to make.

**Website** JWK noted that the site is currently run from Eindhoven, via an SVN fetch plus script. MK was moving to GIT — JWK could easily change the script to that. MK has an OpenMath organisation on GitHub. For example, this hosts the Python phrasebook under development in OpenDreamKit.

### 1.1 Extension Proposals

\* Language

1. Binders — various questions
  2. Record structures
  3. sequence variables
  4. general literals (FR) — would subsume OMI etc., and allow more
- \* Encodings

5. Content MathML 3
6. endianness (LH etc.)
- \* CDs
7. Allow OMOBJ in CMP
8. Notation definitions
9. DefMP
10. Rethink the role concept
- \* Types
11. LH would like to extend STS.

MK would like to propose that the principle of *compositionality* — “the meaning of a complex expression is determined by the meanings of the constituent expressions and the rules used to combine them”.

“every student sleeps” is  $\forall x : \text{student}(x) \Rightarrow \text{sleeps}(x)$ , and note that “every” leaks out from its Noun Phrase.

MK notes that several rejections in the past have been, implicitly, rejections for breaking compositionality.

?? commented that developing the Python phrasebook had caused many proposals.

**Q** Any idea which ideas are easier than others?

**MK** It’s not necessarily linear.

## 2 SCSCP: Tom Wiesing

See [?].

**Aim** Communicate between computer algebra systems.

**OM** handles the description of the objects,

**But** not the actual protocol

Three types of messages

1. General
2. Procedure Calls: consists of procedure being called, and arguments, and any options (currently an OMATTR) such as memory limits.
3. Procedure Results. Call ID, statistics results.

The messages themselves are OM objects. Uses TCP/IP sockets. Certain standard procedure, such as store, retrieve. Defined in SCSCP1 CD.

Used by GAP, Maple, KANT, MuPAD. See <http://wqww.symbolic-computing.org/scscp>.

**JWK** Contrasted this with MONET [?, ?] (to SCSCP's advantage). Note that we should adopt the libraries as well as just the standard in abstract.

**All** The usual debate about whether  $2 + 2$  should always give 4.

**JWK** Experimental Directives CD as well.

### 3 Discussion continued

#### 3.1 Binding

MK introduced the problem of the scope of bound variables.  $\int_{x>0} f(x)dx$  was his example. Also  $\bigcup_{i \text{ prime}} A_i$ .

### 4 Drafting DLMF CDs: Miller

Turned into a book and a website. BM had written various “semantics macros” in  $\text{\TeX}$ . Intention is to publish the macros and the CDs containing the symbols that correspond to them. One key question is “when does a symbol warrant definition”. Is  $\log_2$  worth it?

Complains that OpenMath has Camelcase versus hyphens, underscores and even spaces in symbol names. Should there be a standard, or recommendation? Also `orthopoly1` has Legendre *functions*, not polynomials!

DLMF uses the  $k$  form of elliptic functions, but Mathematica the  $m$  form.

There's an existing OpenMath `Airy` CD, so I have added `_DLMF` where appropriate.

The long-term aim is to generate a proper CD from the DLMF database.

**Q** Could you generate notation descriptions from this as well?

**A** Probably: depends on the methodology?

There are several equations in DLMF: it is hard for BM to decide which ought to be DefMPs. Many functions are defined as solutions of differential equations, and the links to the initial conditions are not always clear.

### 5 Implicit CDs in the NIST Digital Repository of Mathematical Formulae: Schubotz

Initially there was DLMF Formulae home pages. CDs weren't there (see previous talk) so used the macro name. In 2014 KLS(OP) Formulae, which needed 153 DRMF macros.

in 2015, we added about 5000 eCF/BMP Formulae home pages, which weren't L<sup>A</sup>T<sub>E</sub>X formulae. use  $\sin@z$  to get  $\sin z$ , but  $\text{Ei}@z$  to get  $\text{Ei}(x)$ . The proof is basically text, not machine-readable.

These data are stored in Wikibase (RDF). Wikibase contains 20M objects and 88M statements. Example: mayor of New York.

Math data type introduced in Feb 2016, only 187 so far.

## 6 OpenMath Society Formal Meeting

### 6.1 Election of Chair

MK proposed, seconded and carried.

### 6.2 Secretary and Minute Checkers

JHD proposed by MK, seconded and elected. JWK and BM as Checkers.<sup>1</sup>

### 6.3 Annual report

Last Open Business Meeting 2014 in Coimbra.

### 6.4 Balance Sheet and Discharge of EC

No transactions and no balance. The Executive Committee was formally discharged for the previous years.

### 6.5 New members

MK proposed Alexander Konovalov, Markus Pfeiffer, Nicolas Thierry, Dennis Müller, Tom Wiesing. Also Wolfram Sperber was proposed. These were all accepted by the meeting.

### 6.6 Executive Committee

The following were proposed.

**President** MK

**Vice-president** JHD

**Secretary** FR

**MathML** PDFI

**Member-at-Large** Alexander Konovalov

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<sup>1</sup>These minutes as recorded here have been accepted as accurate by the checkers.

**Member-at-Large** JWK

**Member-at-Large** Tom Wiesing

This was so we satisfied (after some struggle) the “president and five to seven members” rule. All were accepted.

## 6.7 SCSCP

MK proposed, JHD seconded, that the EC be instructed to set up a copy to explore the options with the SCSCP authors, and bring a formal proposal to the next GM. The group proposed was MK, JHD, AK. Carried unanimously

## 6.8 OpenMath extensions

JHD noted that MathML3/ ISO standard refer to “S. Buswell, O. Caprotti, D. P. Carlisle, M. C. Dewar, M. Gaëtano and M. Kohlhase (editors); The OpenMath Standard Version 2.0, The OpenMath Society, 30 June 2004. (<http://www.openmath.org/standard/om20-2004-06-30/>)”. Hence we have three sensible choices.

1. Do nothing
2. Build a new standard (possibly errata to the old) which was explicitly upwards compatible.
3. Build a new standard which was explicitly not upwards compatible.

Bad Build a new standard which was accidentally not upwards compatible.

MK noted that, in practice, his group is not using precisely OpenMath. He would like a ‘language extension dictionary’ mechanism.

He would like us to charter a subgroup to come back next year. There was a concern that OM3 objects might be completely unreadable by OM2 processors. He would like us to have a Standards Extension Committee. Significant debate.

JHD proposed this, for MK+volunteers to work on an Extension Committee, to bring its Charter back to the adjourned GM on Friday 29th June. The Group then to bring proposals back to the 2017 GM. Unanimous.

He proposed that a group prepare a proposal for “2.0 second edition”, or something similar, to propose a way forward for explaining that Content MathML is an encoding, and fixing what other bugs then could. JHD, PDFI, TW + volunteers. To be presented to the group on Friday. Unanimous.

## 6.9 Adjournment

The meeting adjourned until Friday 29th.

The adjourned meeting was chaired by the President, with five other members present physically, and LH by Skype.

## 6.10 OpenMath 2.0 Revision 1

JHD presented the results of the working party. This changes to <http://www.openmath.org/standard/om20-2004-06-30/>, the page pointed to by the MathML 3 standard, were approved (subject to adding dates to the various revisions, and deleted the explanation of browsers).

The changes to the normative text were approved. The Committee was charged with making the appropriate changes to the header, and to a new Appendix F.4 describing the changes from the original to Revision 1.

It was not clear from the records whether the OpenMath Society had formally endorsed Popcorn. The WP was charged with investigating this issue and making any necessary modifications.

The WP would prepare the final versions of the files, and a note to be circulated to the OpenMath Society, for approval by e-mail by the Executive Committee, and implementation.

One outstanding issue was bug reports 107/114 about OMF. These would be addressed by the WP (consulting the Math WG as appropriate, for the OpenMath text is identical with MathML 3) for Revision 1.

## 6.11 Web Committee

Background: the committee had been inactive for some years, and both the style and content were outdated. Some members of the Committee have moved on. The meeting therefore chartered a new Committee, with a remit to consider both the menu etc. structure and the layout of the website, but maintaining sufficient backwards compatibility. This structure should be approved by the Executive Committee, rather than waiting for OM 2017. Membership: J-WK, TW, PL if he still has the time, and any further volunteers.

## 6.12 OpenMath Repository

The Web Committee recommended, and the Meeting accepted, that we should move from the current SVN (hosted at DFKI though there had been no active OMSoc member at DFKI for some years) to a public repository, specifically to a new OpenMath Organisation in GitHub. The move took place during the meeting.

Since the repository and web site are linked, the Web Committee was further charged with restructuring the repository as a whole. The Web Committee should also announce the move to the Society as a whole.

## 6.13 OpenMath Language Extensions Committee (OLEC)

The OpenMath Business Meeting 2016 mandates the OLEC to study accommodating extensions of OpenMath that strengthen compositional representation of mathematical objects.

Concretely the OLEC is charged to develop a concrete proposal for consideration by the OpenMath Business Meeting 2017. This proposal could take the form of

- not preparing any new documents,
- a new version of the OpenMath standard (OM2.1 or OM3), or
- an auxiliary standard for a language extension mechanism.

The tasks of the OLEC will include, but not be limited to

- triaging and considering existing OpenMath language extension proposals (most recorded as issues at <https://github.com/OpenMath/OM3/issues>)
- initiating a call for language extensions to the OM community

The OLEC will be chaired by the OpenMath President and Vice President and is open to all interested members of the community and will conduct its deliberations openly. JWK volunteered. **Approved unanimously.**

The meeting closed at 12:35 on Friday 29 July 2016.