Title: Blogs, Wikis, MathML: Scientific Communication

Date: Sep 08, 2008 02:00 PM

URL: http://pirsa.org/08090027

Abstract: In the 1990s, the eprint arXivs fundamentally reshaped scientific communication in Math and Physics. In this decade, blogs, wikis and other, similar, tools are mediating an equally profound reshaping of scientific communication. I will talk about my own experience, as a blogger, software designer, and physicist, pointing to some of the successes and some of the challenges ahead.

Blogs, Wikis, MathML

scientific communication in a new century

Jacques Distler

University of Texas at Austin

Electronic Distribution of Manuscripts

Founded in 1991 (email-based). Web interface ~ 1994

Cornell University Library

arXiv.org

Open access to 394,728 e-prints in Physics, Mathematics, Computer Science and Quantitative Biology

Subject search and browse: [physics ▼] (Search) (Form Interface) (Catchup)

See cumulative "What's New" pages.
Robots Beware: indiscriminate automated downloads from this site are *not* permitted.

Physics

- Astrophysics (**astro-ph** new, recent, abs, find)
- Condensed Matter (**cond-mat** new, recent, abs, find)
  includes: Disordered Systems and Neural Networks; Materials Science; Mesoscopic Systems and Q
  Soft Condensed Matter; Statistical Mechanics; Strongly Correlated Electrons; Superconductivity
- General Relativity and Quantum Cosmology (**gr-qc** new, recent, abs, find)
- High Energy Physics – Experiment (**hep-ex** new, recent, abs, find)
- High Energy Physics – Lattice (**hep-lat** new, recent, abs, find)

Revolutionary

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    - Did not change the "quantum" of scientific communication

A "Commentary Layer"

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  - "A Comment on …"
    - "A Response to …"

  - "An Overview of …" (c.f. Living Reviews)

  - Back-and-forth discussions

Most Efforts Foundered

- Hand-maintaining a large web site painful
- Existing CMS tools too difficult
- Poor (to nonexistent) support for math

One notable exception:

John Baez's Stuff   Fun Stuff   Physics FAQ   Relativity On The Web   Nasty Stuff   Quantum Gravity Seminar   Serious Stuff

This Week's Finds in Mathematical Physics

John Baez

This is my column on mathematical physics. It appears on sci.physics.research, sci.math.research, sci.physics, and
here has pretty pictures and other nice features:

The latest edition

All the old issues

Table of contents

21st Century Technology

A new class of easy-to-use CMS ("blog") software
Easy to maintain large, frequently-updated site, with user comments, etc
Math still a problem.
MathML?

6 years ago, I decided to try ...

Musings

Musings

Thoughts on Science, Computing, and Life on Earth.

November 16, 2006

SEGAL ON QFT

I spent a delightful afternoon, yesterday, discussing quantum field theory, the renormalization group, and such matters with Graeme Segal. Earlier, he gave a nice talk in the Geometry and String Theory seminar on his approach to QFT.
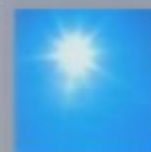
Continue reading "Segal on QFT" ...
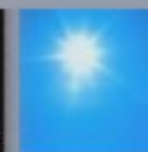**Posted by distler at 4:37 PM | Permalink | Followups (6)**

November 11, 2006

Austin Wea

Today
Sunny
High: 74°F
PoP: 0%

Tonight
Clear
Low: 42°F
PoP: 0%

Tomorrow
Sunny
High: 67°F
PoP: 0%

Currently: Fair, 6
(**Doppler R**

MathM

Posts with this lo
see the equation
Mozilla (with the
IE/Win users can download a
The posts were authored in i
WebTeX) using the itexToMM

XHTML + MathML + (the odd bit of) SVG

Back Forward Reload Stop http://golem.ph.utexas.edu/~distler/blog/archives/000887.html

Home Bookmarks SPIRES Mozilla.org Photo Album Blog Admin Validate Page Validate CSS nyt

Top Up First Previous Next Last Document More

Chiral Symmetry Breaking | M...

solutions. The result is that the transition temperature is $T_\chi = 0.154/L$. This, of course, hol so long as $T_\chi > T_d$.

$$T_d = \frac{1}{2\pi R}$$

$$T_\chi = \begin{cases} 0.154/L & T_\chi > T_d \text{ (or, equivalently, } L/R < 0.97) \\ T_d & \text{otherwise} \end{cases}$$
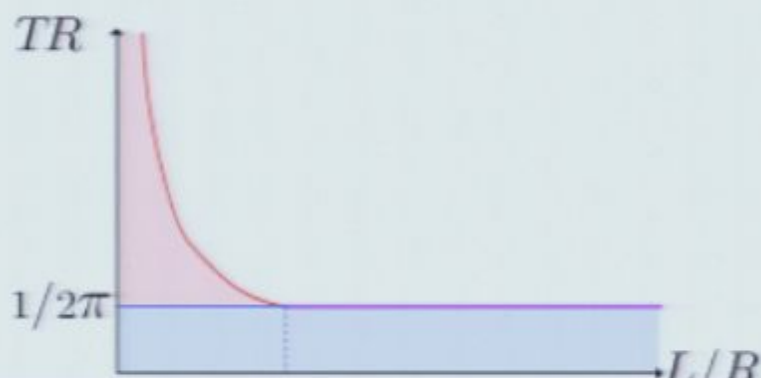
So the phase diagram found by Aharony et al loo the **figure** at left. All of the phase transitions ar order. In the pale blue region below TR $= 1/2\pi$, theory confines and chiral symmetry is broken. pink region, the theory is deconfined but, noneth chiral symmetry is broken. Above all the lines, c symmetry is unbroken and the theory is deconfi

TR

$1/2\pi$

L/R

Under the Hood

MovableType

Was proprietary (but "source available."). Now GPL.

plugin architecture; plugins freely distributable.

At the time (and still) best available architecture for the purpose

itex2MML

Stream filter (original by Paul Gartside) and MovableType text filter plugin to convert TeX markup to inline MathML

MathML

An XML dialect *designed* for putting math on the Web.

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- compatible with CSS, DOM scripting, etc.

Pictures

In the classical (smooth) category, there is no ambiguity as to what it means for a function u to "solve" an equation such as (1); but once one is in a low regularity class (such as the class of finite mass solutions), there are several competing notions of solution, in particular the notions of a *strong solution* and a *weak solution*. To oversimplify a bit, both strong and weak solutions solve (1) in a distributional sense, but strong solutions are also continuous in time (in the space $L^2(\mathbb{R}^d)$ of functions of finite mass). A canonical example here is given by the pseudoconformally transformed soliton blowup solution

$$u(t, x) := \frac{1}{|t|^{d/2}} e^{-i/t} e^{i|x|^2/4t} Q(x/t) \ \textbf{(2)}$$

to (1), where Q is a solution to the ground state equation $\Delta Q + |Q|^{4/d}Q = Q$. This solution is a strong solution on (say) the time interval $(-\infty, 0)$, but cannot be continued as a strong solution beyond time zero due to the discontinuity at t=0. Nevertheless, it can be continued as a weak solution by extending by zero at t=0 and at $t > 0$ (or alternatively, one could extend for $t > 0$ using (2); thus there is no uniqueness for the initial value problem in the weak solution class. Note this example also shows that weak solutions need not conserve mass; all the mass in (1) concentrates into the spatial origin as $t \to 0$ and disappears in the limit t=0).

[Terrence Tao's blog](#); PNG equations by LaTeXRender.

Scaled

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$$|^2/^{4t}Q(x/t) \quad (2)$$

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Redone as MathML

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Clients

Six years ago, things were rough. But now, with

- STIX Fonts (free, high quality, comprehensive math fonts)

- Firefox 3.x

- MathPlayer plugin for Internet Explorer

have high-quality MathML rendering available *almost* everywhere (sorry iPhone users!).

XHTML

- MathML support in browsers only for XHTML+MathML, served with an XML Mime-type.

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  - several plugins
  - Extensive tweaking of templates
  - 1783 line patch file for MT 3.3

Ensuring Well-Formedness

1. Forbid markup. Require a pseudo-markup language (e.g. Markdown).

   - Disadvantage: limited & users must learn yet another markup syntax.
   - Most implementations **fail** to ensure well-formedness. (**Don't** try to produce XML by concatenating strings.)

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   - Disadvantage: puts onus on user to correct problem(s).
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3. Take the input, parse to a tree (vigourously "correcting" it, à la HTML5lib). Then use a XML serializer to output the result.

    - As with 2, unexpected results can be frustrating to users

    - hard to retrofit an existing system (like MT).

Hook W3C Validator into "Preview" Function

Invisible, but unavoidable.

Name:

Jacques Distler

Email Address:

distler@golem.ph.utexas.edu

URL:

http://golem.ph.utexas.edu/~distler/blog/

Text Filter: itex to MathML with parbreaks ⬍

Subject: Test Comment

Comment:

```
Let's try an equation.
$$
  {\int_{-\infty}^\infty e^{-x^2} dx} =
\sqrt{\pi}
$$
Oh joy and jubilation!
```

PREVIEW

HTML5

In the future, none of this will be necessary.

HTML5 (in progress @ W3C) will allow embedding MathML (& SVG) in HTML.

But

- No existing implementations.

- Could be as long as a decade, before HTML5 Specification is finalized.

How well does it work?

Perhaps, I'm not a fair test-case.

By grim necessity, I became something of an expert on the esoterica of XHTML+MathML.

Fortunately …

"Average" Users

The n-Category Café

A group blog on math, physics and philosophy

March 3, 2007

A Topos Foundation for Theories of Physics

Posted by John Baez

Here's a big new paper:

- Andreas Döring and Chris Isham, **A topos foundation for theories of physics**.

MathML
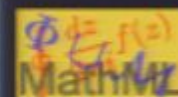
Posts with this log
see the equations,
Mozilla (with the r
IE/Win users can download a
The posts were authored in ite
WebTeX) using the itexToMML
for MovableType (the README

March 2007

Sun Mon Tue Wed Thu

The String Coffee Tabl

A Group Blog on Physics

Over 1700 Entries, Over 16500 Comments

	Entries	Comments	Trackbacks	Since
Musings	716	2994	443	10/2002
String Coffee Table	292	1708	618	12/2003
n-Category Café	694	11841	1510	8/2006

All well-formed (in fact, valid) XHTML+MathML+SVG.

It "Just Works"

Authors and commenters at (say) n-Category Café don't know or care about XHTML, MathML, well-formedness, MIME-types, …

They type equations in TeX, use either Markdown or simple (X)HTML markup.

Trackbacks

Trackback Page

Trackbacks for math/0503266

Gukov on Surface Operators in Gauge Theory and Categorification [The String Coffee Table @ golem.ph.utexas.edu/string] [trackback posted Tue Jun 27 05:42:44 2006]

Talks by Hopkins and Willerton [The n–Category Café @ golem.ph.utexas.edu/category] [trackback poste 15:14:50 2006]

Flat Sections and Twisted Groupoid Reps [The n–Category Café @ golem.ph.utexas.edu/category] [trac Wed Nov 8 18:45:39 2006]

The Baby Version of Freed–Hopkins–Teleman [The n–Category Café @ golem.ph.utexas.edu/category posted Thu Nov 23 15:34:13 2006]

More Mathematical Blogging | The n–Category Café [The n–Category Caf\'e @ golem.ph.utexas.edu/c [trackback posted Fri Jun 29 12:34:52 2007]

The FRS Theorem on RCFT | The String Coffee Table [The String Coffee Table @ golem.ph.utexas.edu [trackback posted Sat Dec 1 17:43:20 2007]

An Introduction to Algebraic Topology | The n–Category Café [The n–Category Café @ golem.ph.utexas.edu/category] [trackback posted Sat Dec 1 18:00:00 2007]

Isham on Arrow Fields | The n–Category Café [The n–Category Café @ golem.ph.utexas.edu/category posted Sat Dec 1 18:00:00 2007]

The Blog Post

For every k, there is a canonical gerbe on G, whose Dixmier-Douady class is just that $\in H^3$. In fact, from a certain point of view #, the central extension $\hat{\Omega}_k G$ is that gerbe on G.

Like a bundle is trivialized by a function. A gerbe may be trivialized by a bundle. Even if the is nontrivial, it can still be "trivialized" in a generalized sense - by a twisted bundle.

Like we have a notion of **K-theory** obtained by taking the group completion of the decategorification of the category of vector bundles on a space, we have a notion of **twisted K-theory** by doing the same with such twisted bundles.

Now, the group G acts on itself by conjugation. We might hence be interested in the K-theo the quotient G/G. This amounts to looking at the (twisted) K-theory of G-equivariant (twi bundles on G.

So that's some ring, let's denote it by

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Thriving ecosystem of blogs in Mathematics.

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- "Commentary Layer" culture (MR, *etc*) predisposed them to embrace blogs.

Lessons

- *Must* be open-source

- Needs to be easy to set up

  - "one-click install"

- Visitor experience improvements

  - Bring MathML support to WebKit
  - Copy and paste MathML
  - etc…

Collaboration Tool

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Remote collaborations mostly consist of emailing around TeX files.

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For "knowledge accumulation," what we need is an itex-enabled **Wiki**!

Instiki

A Ruby-on-Rails based Wiki.

- Open source.

- Template-based. But easy to replace components which handle user-content with ones which parse their input and then serialize (using REXML) to XML.

- Absolutely *trivial* to set up. Bundled with built-in WebServer.

My version

- Maruku (Markdown implementation)

- itex2MML (itex support via Ruby bindings)

- xhtmldiff ("redline docs" of revisions)

- (a heavily-hacked version of) S5 (Presentations)

Features

(password-protected) Wiki, under one instance

a read-only version of a password-protected Wiki

sion history, with redline 'diff's between successive versions, ability to changes.

uploads.

TeX and extended Markdown input.

$$\int_{-\infty}^{\infty} e^{-x^2}\, dx = \sqrt{\pi}$$

Export to LaTeX

entations.

Madge: "You're soaking in it"

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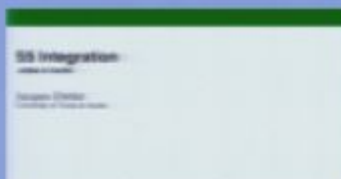
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$$\int_{-\infty}^{\infty} e^{-ax^2} \, d\,x = \sqrt{\frac{\pi}{a}}$$

- Export to LaTeX.

- Presentations.

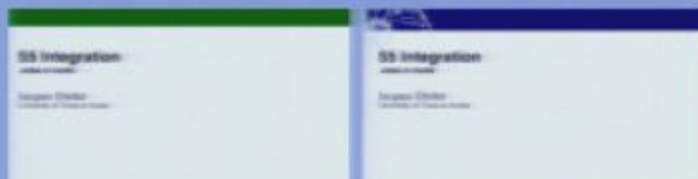*Madge: "You're soaking in it."*

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- It's time to "take back the Web."

No Signal

VGA-1

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