John Baez

This Week's Finds

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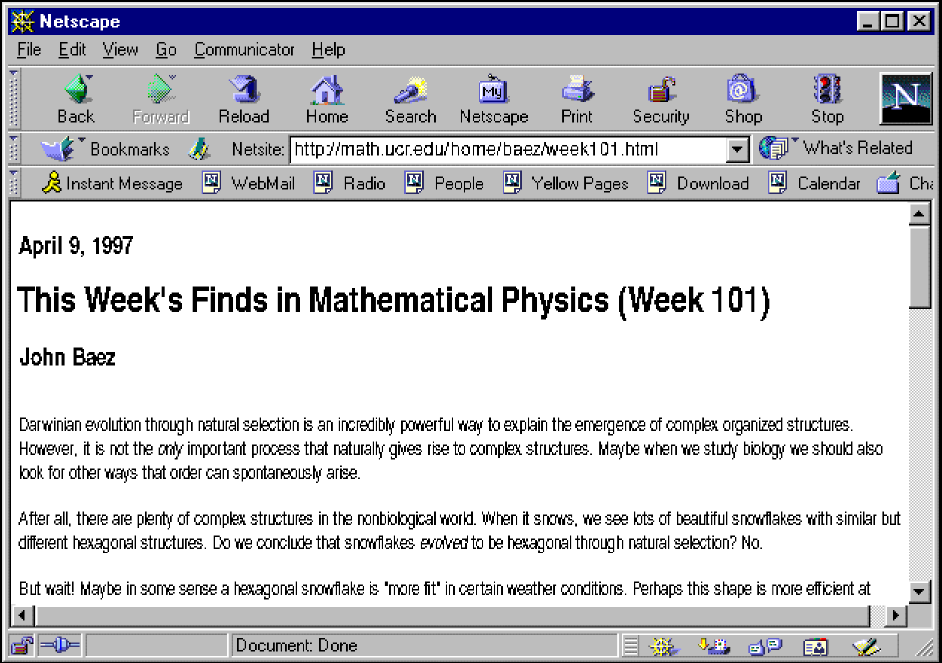
Author: baez@guitar.ucr.edu (John Baez) Date: 19 Jan 1993 00:04:23 GMT

Subject: This Week's Finds in Mathematical Physics

I thought I might try something that may become a regular feature on sci.physics.research, if that group comes to be. The idea is that I'll briefly describe the papers I have enjoyed this week in mathematical physics. I am making no pretense at being exhaustive or objective... what I review is utterly a function of my own biases and what I happen to have run into. I am not trying to "rate" papers in any way, just to entertain some people and perhaps inform them of some papers they hadn't yet run into. "This week" refers to when I read the papers, not when they appeared (which may be much earlier or also perhaps later, since some of these I am getting as preprints).

1) Syzygies among elementary string interactions in 2+1 dimensions, by J. Scott Carter and Masahico Saito, Lett. Math. Phys. 23 (1991), 287-300.

On formulations and solutions of simplex equations, by J. Scott Carter and Masahico Saito, preprint. (Carter is at F4T3%USOUTHAL.bitnet@VM.TCS.Tulane.EDU.)



April 9, 1997

This Week's Finds in Mathematical Physics (Week 101)

John Baez

Darwinian evolution through natural selection is an incredibly powerful way to explain the emergence of complex organized structures. However, it is not the *only* important process that naturally gives rise to complex structures. Maybe when we study biology we should also look for other ways that order can spontaneously arise.

After all, there are plenty of complex structures in the nonbiological world. When it snows, we see lots of beautiful snowflakes with similar but different hexagonal structures. Do we conclude that snowflakes *evolved* to be hexagonal through natural selection? No.

But wait! Maybe in some sense a hexagonal snowflake is "more fit" in certain weather conditions. Perhaps this shape is more efficient at

January 10, 2004

This Week's Finds in Mathematical Physics (Week 201)

John Baez

Lately James Dolan and I have been studying number theory. I used to hate this subject: it seemed like a massive waste of time. Newspapers, magazines and even lots of math books seem to celebrate the idea of people slaving away for centuries on puzzles whose only virtue is that they're easy to state but hard to solve. For example: are any odd numbers the sum of all their divisors? Are there infinitely many pairs of primes that differ by 2? Is every even number bigger than 2 a sum of two primes? Are there any positive integer solutions to

$$x^n + y^n = z^n$$

for $n > 2$? My response to all these was: WHO CARES?!

Sure, it's noble to seek knowledge for its own sake. But working on a math problem just because it's hard is like trying to drill a hole in a concrete wall with your nose, just to prove you can! If you succeed, I'll be impressed - but I'll still wonder why you didn't put all that energy into something more interesting.

Now my attitude has changed, because I'm beginning to see that behind these silly hard problems there lurks an actual *theory*, full of deep ideas and interesting links to other branches of mathematics, including mathematical physics. It just so happens that now and then this theory happens to crack another hard nut.

I'd known for a while that something like this must be true: after all, when Andrew Wiles proved Fermat's Last Theorem, even the newspapers admitted this was just a spinoff of something more important, namely a special case of the Taniyama-Shimura


23:18
This Week's Finds (Week 301)
Posted by John Baez
The first 300 issues of This Week's Finds were devoted to the beauty of math and physics. Now I want to bite off a bigger chunk of reality. I want to talk about all sorts of things, but especially how scientists can help save the planet. I'll start by interviewing some scientists with different views on the challenges we face — including some who started out in other fields, because I'm trying to make that transition myself.
By the way: I know "save the planet" sounds pompous. As George Carlin joked: "Save the planet? There's nothing wrong with the planet. The planet is fine. The people are screwed." (He actually put it a bit more colorfully.)

John Carlos Baez @johncarlosbaez · 3 Aug 2020 ···

A rotation in 4 dimensions is almost the same as a pair of rotations in 3 dimensions. This is a special fact about 3- and 4-dimensional space that doesn't generalize. It has big implications for physics and topology. Can we understand it intuitively?

(1/n)

27 292 1,003

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