Digitizing the Entire Mathematical Literature

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- Part I: **The Digital Library: What Wild Surmise**

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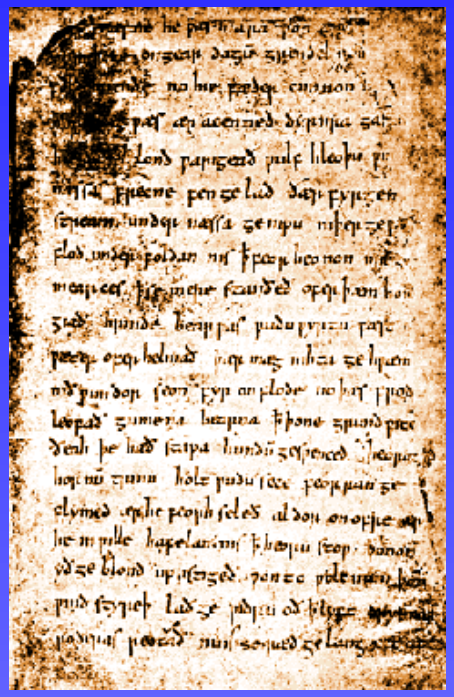
"The common principle is that those who write, disseminate, and store mathematical literature should act in ways that serve the interests of mathematics, first and foremost."

(CEIC Best Practice Statement)

THE BEOWULF SAGA



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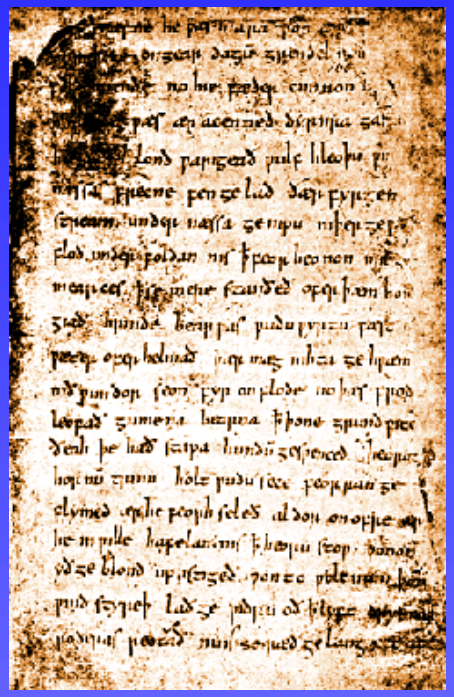

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And it helps to **understand the present** — **CEIC**!

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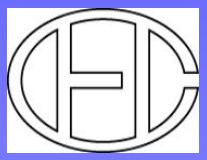

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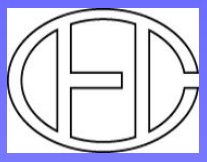

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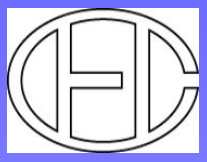

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It's something that has members, with membership for a minimum time but renewable; that has few if any employees; that has rules governing membership; that provides benefits; that itself need not own property; that controls only limited funds; that charges modest membership dues. Thus the DML will be both a club, and, through its membership, a distributed collection of digital mathematical content.

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Content owners can, along with other relevant bodies, join the club, and in so doing they sign up to its rules.

What the rules and benefits are must be related to the financial/business model to some degree, and ought to be established or ratified by a standing committee of the IMU/ICIAM in order to ensure that there is fair, balanced international representation for mathematicians and mathematics.

As to benefits, the DML will promote the digitization of mathematics content by establishing a set of standards and guidelines for digitization, by providing tools, by providing a stable and global window to archives. The DML should not require transfer of ownership of content to it from current owners; it need not host content."

David Tranah, CUP

AND A RESPONSE

"I think it is safe that ownership and rights be left untouched by the DML. I would advocate for a neat separation between metadata and actual content.

The DML should host in its own right a large database with rich metadata, freely searchable. Providing the metadata in some compatible format (and allowing its full access without charge) could be the fee content owners 'pay' for joining the club.

As a counterpart, mathematicians would have a single place where to look for any digital maths resource, and the content owners would gain maximum visibility for their publications, even those with restricted access."

Thierry Bouche, NUMDAM

THOMAS JEFFERSON

"If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it.

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Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lites his taper at mine, receives light without darkening me.[1]"

THOMAS JEFFERSON

"If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it.

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• **The intellectual commons**. Aggressive copyright is the enemy of free expression (**Lawrence Lessig**'s cry to 'free culture').

[1] See my **Quotations** page

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[2] A **Tom Lehrer** mp3, with permission

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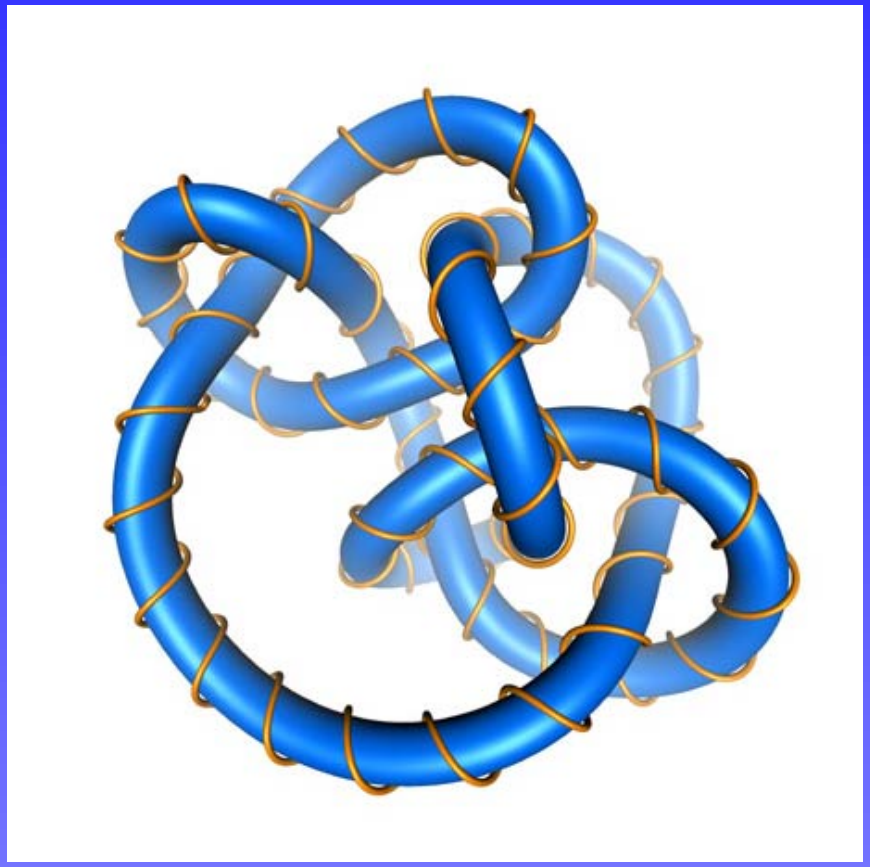
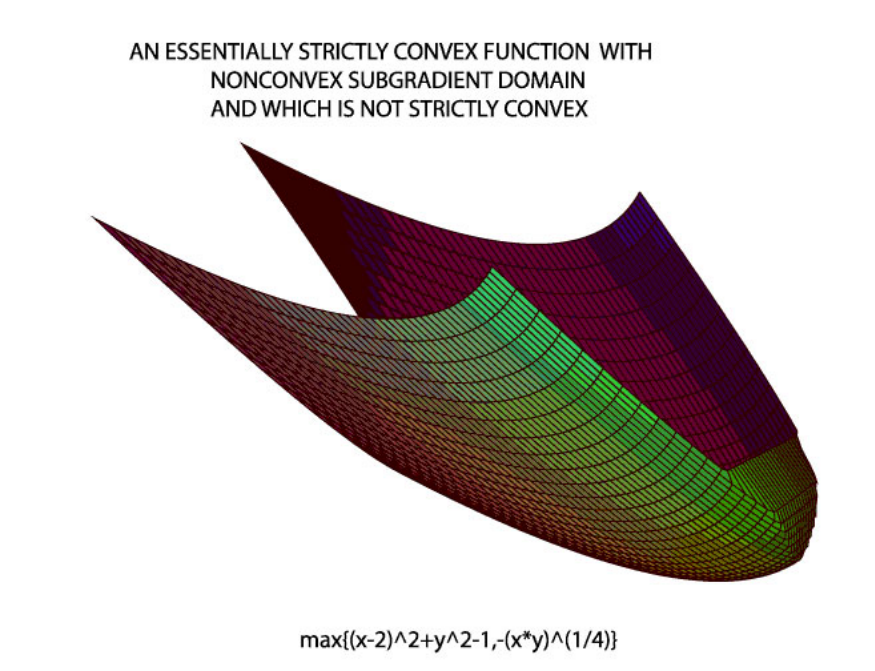
- How to access these at **reasonable (human and dollar) costs**?

THREE DIMENSIONAL SPATIAL KNOTS



In the NewMIC 'Cave'

AND PALPABLE STRUCTURES



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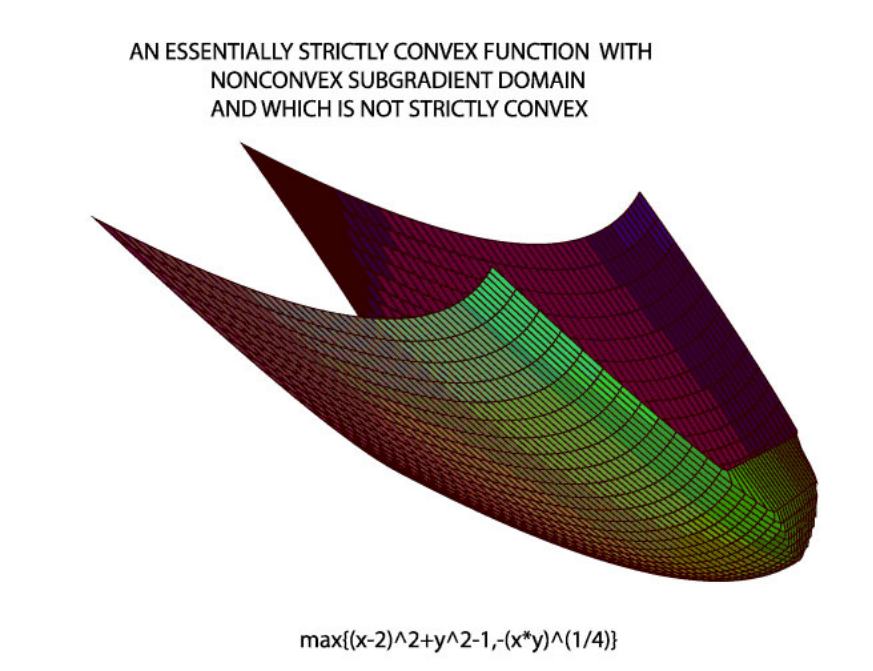

$$f(x,y)) := ((x-2)^2 + y^2 - 1) \vee -\sqrt[4]{xy}$$

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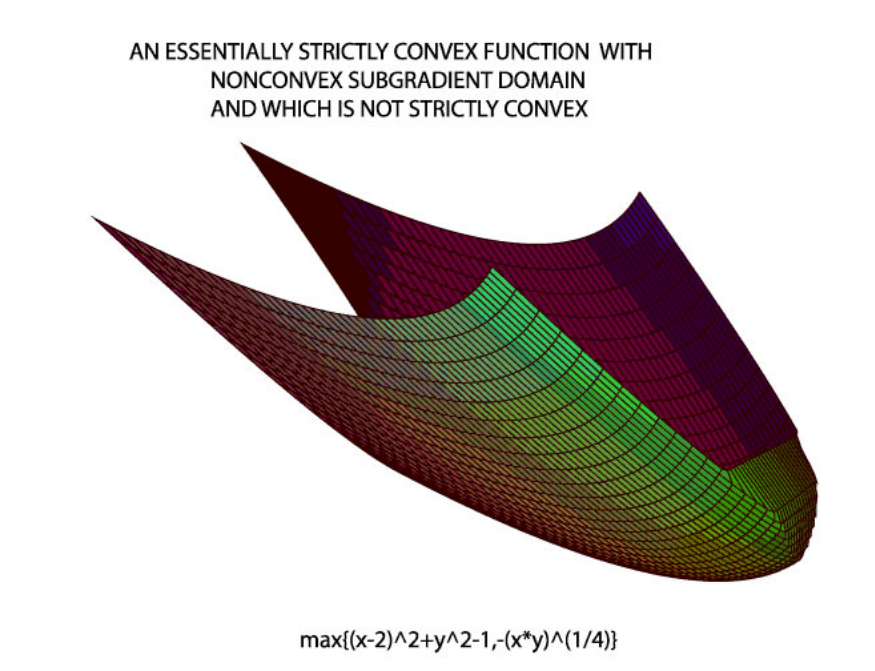

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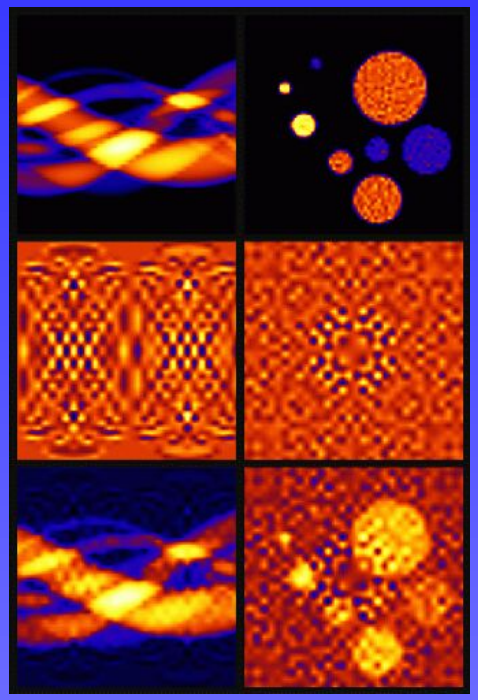
- When appropriately **educated, seeing** is believing

QUALITY OF RECONSTRUCTIONS



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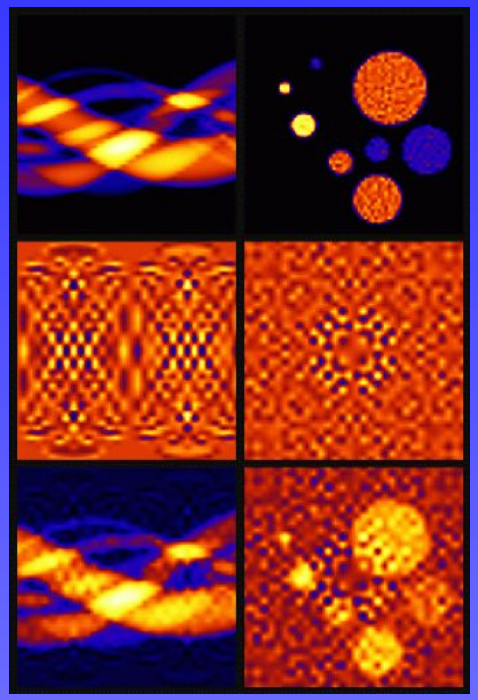

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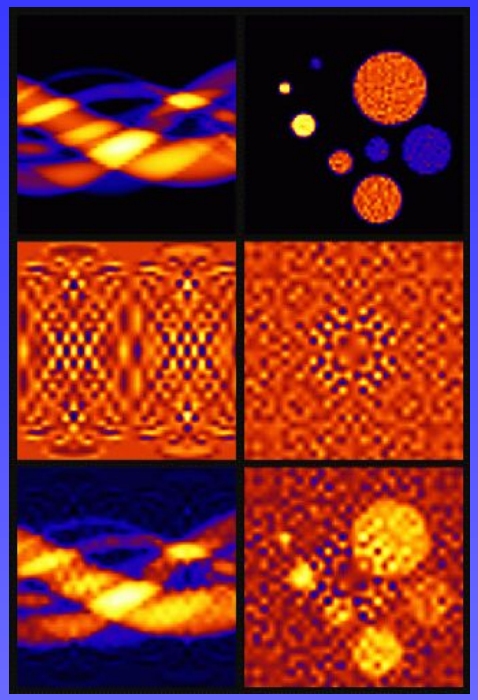

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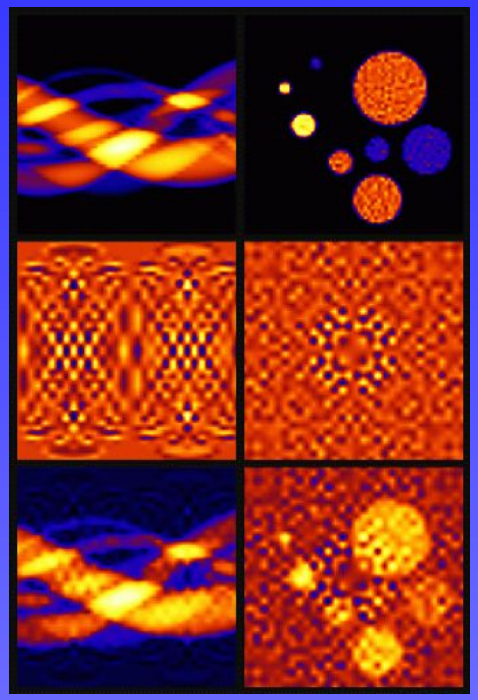

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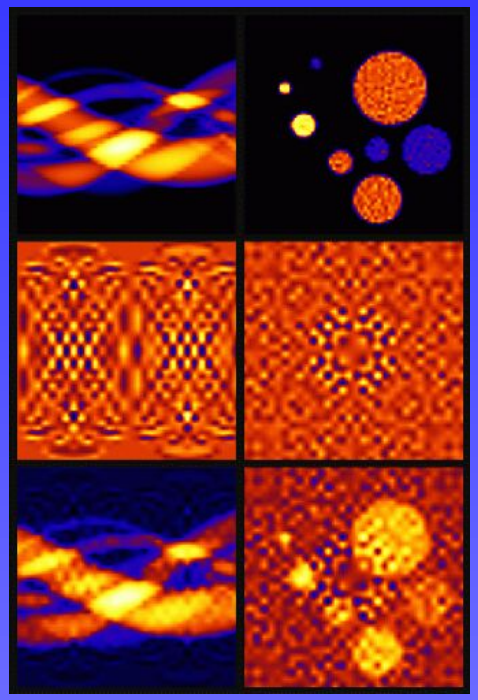

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- **Space and Speed** allow for **Quality** to come to the fore

CINDERELLA'S DYNAMIC PROOFS

- Mathematics is changing

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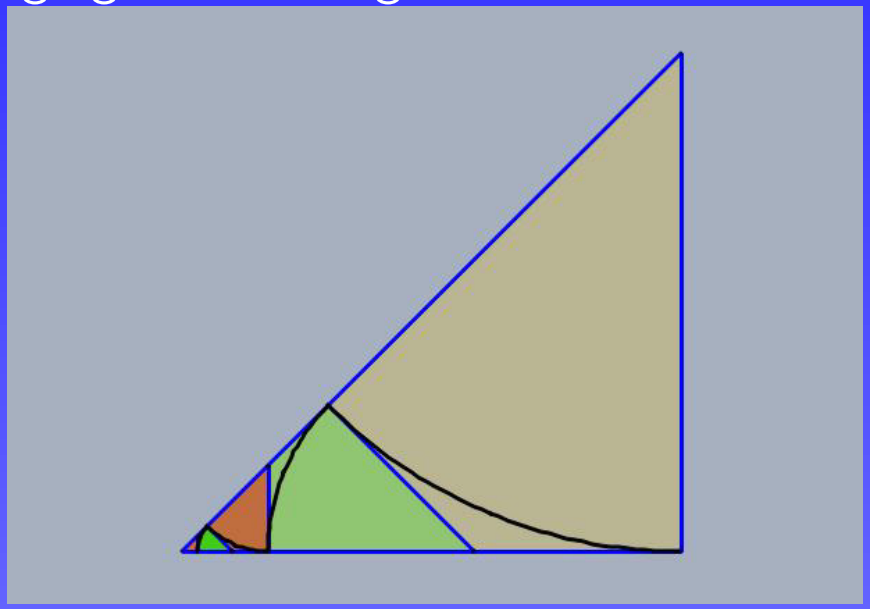

A proof that $\sqrt{2}$ is irrational

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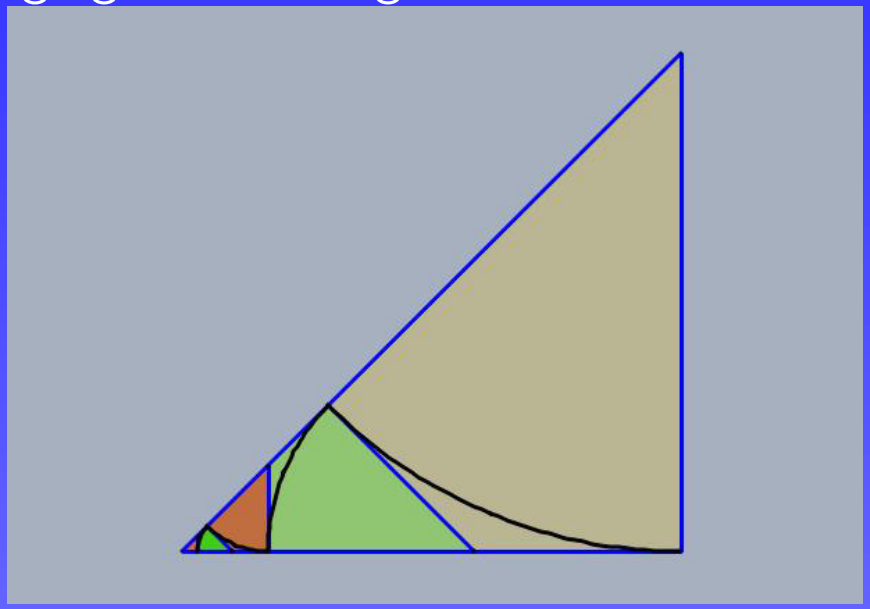

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- **Inter-disciplinarity** is much more **possible** (e.g., **pseudo spectra**)

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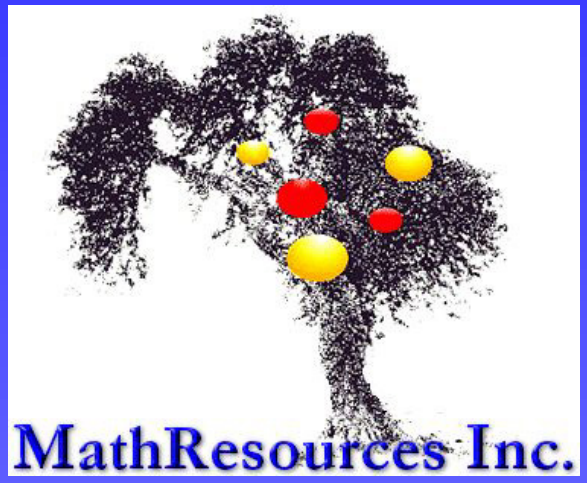

Maple embedded in a 9000 word dictionary. Our logo is the Gauss' family seal

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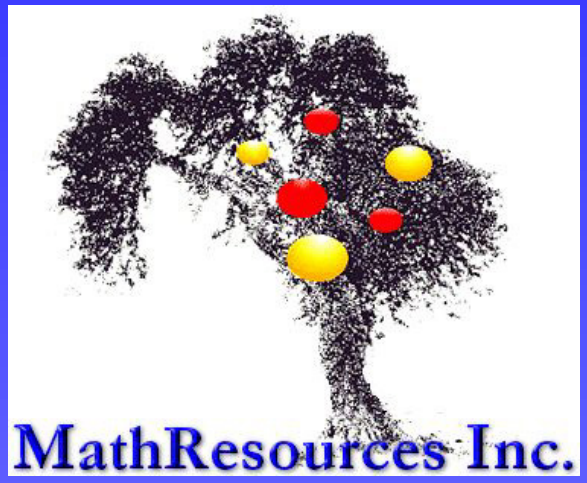

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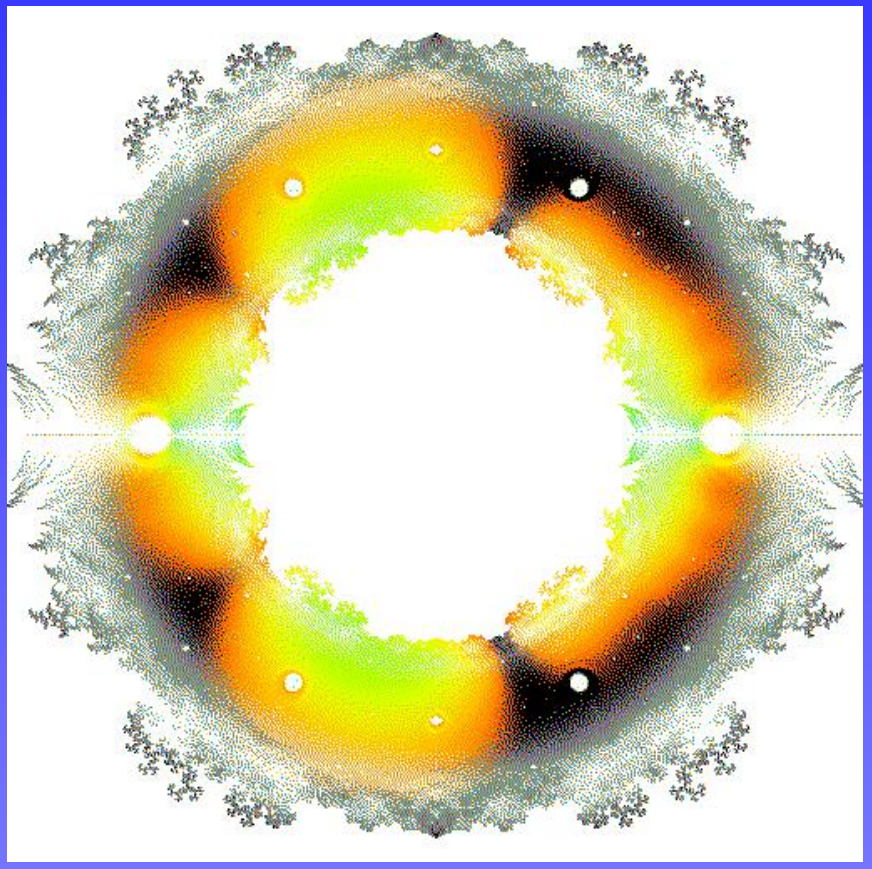
CHAOS IN ROOTS



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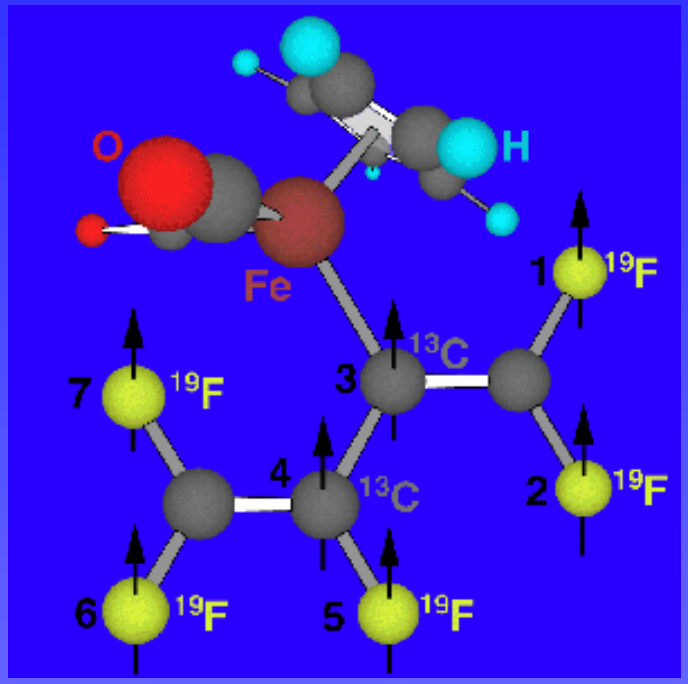

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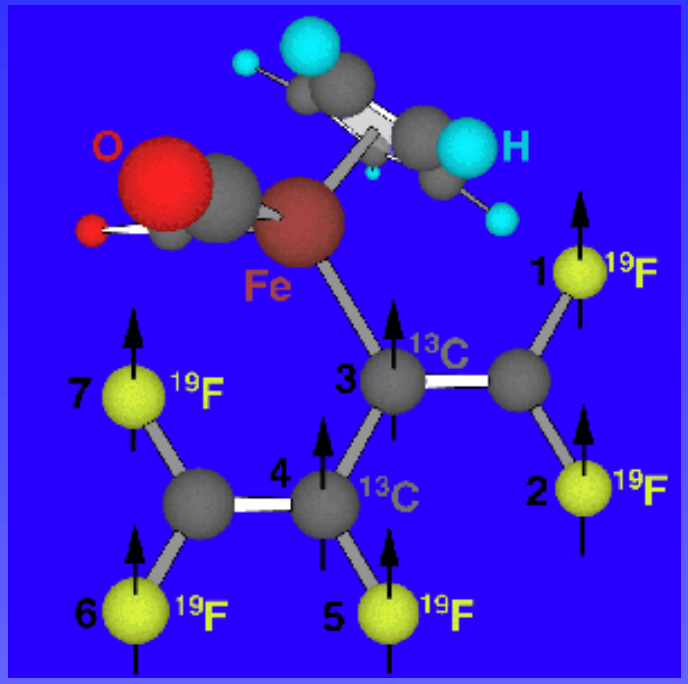

- **Quantum computing goes macro!**[3]

[3] The 2001 factorization of 15 using 10^{20} molecules at IBM

REPTILIAN PARALLELISM

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- **Thank you!**