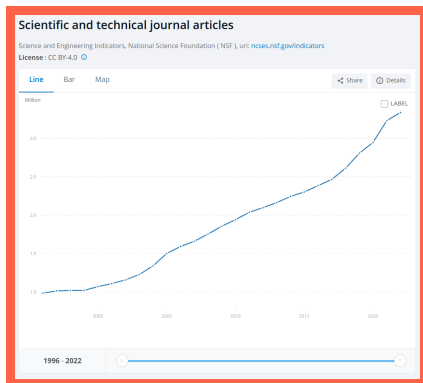


AI for the working mathematician - part 5?

Or: What is...writing with AI?

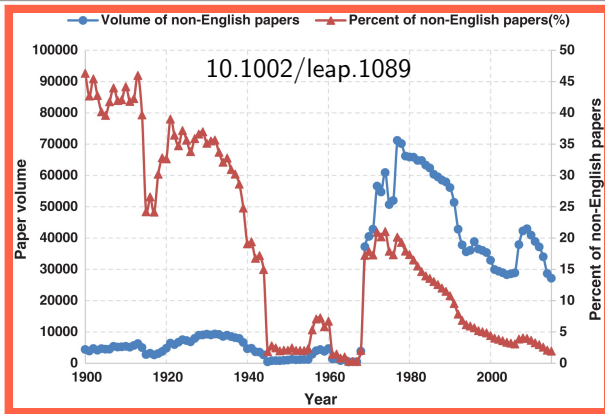
The number of papers grows very fast

<https://data.worldbank.org:>



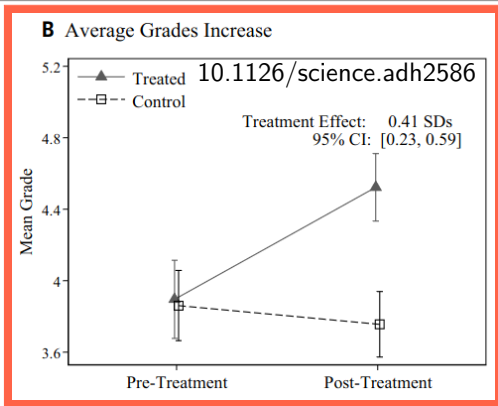
- ▶ **Big picture** Today, well over 5 million academic articles appear every year worldwide, and the total still grows roughly exponentially
- ▶ **Last time** Why this matters for you as a reader
- ▶ **Why this matters for you as an author** You cannot “just have a result”, you need to convince your people to read your papers

Why is AI so good at writing?



- **Slogan** LLMs are pattern machines: trained on huge text corpora, they are very good at local language structure
- **What it is good at** Local wording, sentence flow, removing repetition, etc.
- **What it is not good at** It does not understand your paper; you supply the ideas, it helps with how they are written down

What did studies find?



- **Gains** Noy–Zhang (Science 2023): mid-level professionals with ChatGPT wrote about 40% faster and produced texts rated about 20% higher in quality
- **Who benefits?** Several studies (e.g. on non-native medical writers) report that LLMs can narrow gaps between weaker and stronger writers
- **Takeaway** LLMs are best seen as writing accelerators and clarity boosters

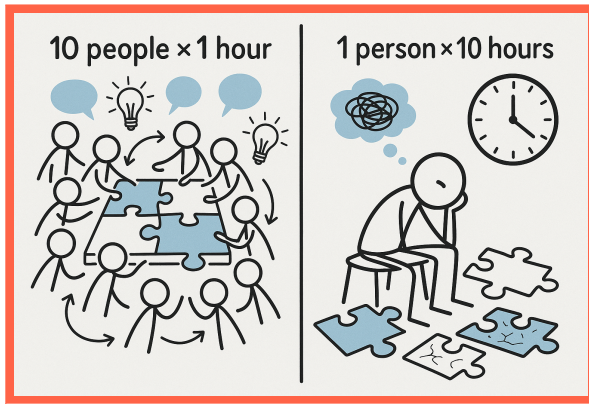
An example from my own writing

1. *DT notes that pyramids will likely outlast humanity, but knot detection barely outlasts the next test set.*
2. *DT notes that pyramids will likely outlast humanity, while knot detection seems designed to collapse at high crossing number.*
3. *DT notes that pyramids will likely outlast humanity, whereas knot detection struggles to survive even a disguised unknot.*
4. *DT notes that pyramids will likely outlast humanity, but knot detection is already undecidable in practice*
5. *DT notes that pyramids will likely outlast humanity, while knot detection disintegrates under Reidemeister moves.*
6. *DT notes that pyramids will likely outlast humanity, though knot detection does not even outlast a rotated diagram.*
7. *DT notes that pyramids will likely outlast humanity, but knot detection remains fragile against undergraduate counterexamples.*
8. *DT notes that although pyramids will likely survive longer than our species, knot detection often fails to survive a new arXiv dataset.*
9. *DT notes that although pyramids will likely survive longer than our species, knot detection still erodes faster than our patience with GPUs.*
10. *DT notes that although pyramids will likely survive longer than our species, knot detection refuses to survive even the small-crossing regime.*



- ▶ **Step 1** I first write a paragraph myself (rough, informal, but with all the mathematical content I want)
- ▶ **Step 2** Then I ask AI to “polish, but keep my voice”, and I get a few variants
- ▶ **Step 3** I edit its suggestions, and repeat

Summary



- ▶ **Why this helps a working mathematician** You can spend more time on ideas and proofs, and less on tweaking sentences and smoothing transitions
- ▶ **Try this next** Take a paragraph from your abstract or introduction, write your own version, then ask AI to make it clearer and more concise
- ▶ **You** are still the author: AI is a noisy writing coach, not a replacement for you

Thank you for your attention!

I hope that was of some help.