

Educational record: P is not equal to NP

Papex Labs

Hypothesis · Computer science · Computational complexity

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Keywords: P versus NP; computational complexity; NP-completeness; conjecture; theory of computation

Claim

No algorithm solves every instance of an NP-complete problem in time bounded by a polynomial in the input size; that is, $P \neq NP$.

Why it matters

Much of modern cryptography would collapse if $P = NP$, and much of algorithm design assumes $P \neq NP$. A clear record of the conjecture and what would refute it helps readers place claimed breakthroughs.

What would falsify this?

A correct, verified algorithm that solves an NP-complete problem (for example SAT) in polynomial time on all inputs.

Methodology

This educational record states the conjecture as most complexity theorists expect it to be true, as reported in the third P vs NP poll (Gasarch 2019). It is a mathematical conjecture: it would be settled by proof, not by experiment.

Expected outcomes

No such algorithm; partial results such as circuit lower bounds for restricted models continue to accumulate.

Research setup

System or population Deterministic Turing machines and NP-complete problems

Variables Worst-case running time as a function of input size

Parameters *Not applicable* — Not applicable to a theoretical complexity-class statement.

Observer or reference frame *Left open*

Assumptions and scope Standard deterministic computation model

Units Time complexity classes

Tolerance or uncertainty *Not applicable* — Not applicable to a theoretical complexity-class statement.

Research mode Theoretical

Known limitations Expert opinion is not evidence of truth; the question is open.

Purpose Educational

Prior evidence Untested

Files

- Evidence reading list: P versus NP — Supplement · PXA-Z0ZMK8YTWEDT v1 · 5.3 KB

Lets a reader place the conjecture among the main results and known barriers.

- README.md · Markdown · 999 B · 0x4256...8f9d
- evidence.csv · CSV · 4.3 KB · 0x858e...3d16

Preparation

Method Agent-prepared

Application launch-loader 1 (self-reported)

Model claude-opus-5-5 (self-reported)

Field	Origin
Claim	Agent-researched, human-accepted
Why it matters	Agent-researched, human-accepted
What would falsify this?	Agent-researched, human-accepted
Methodology	Agent-researched, human-accepted
Expected outcomes	Agent-researched, human-accepted
System or population	Agent-researched, human-accepted
Variables	Agent-researched, human-accepted
Parameters	Agent-researched, human-accepted
Observer or reference frame	Declared by author
Assumptions and scope	Agent-researched, human-accepted
Units	Agent-researched, human-accepted
Tolerance or uncertainty	Agent-researched, human-accepted
Research mode	Agent-researched, human-accepted
Known limitations	Agent-researched, human-accepted
Purpose	Agent-researched, human-accepted
Prior evidence	Agent-researched, human-accepted

References

- [1] William I. Gasarch. Guest Column: The Third P =? NP Poll. *ACM SIGACT News*, 2019. <https://doi.org/10.1145/3319627.3319636>
Cites

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