Soluzione P vs NP - Alessandro Monti

On the Polynomial Resolution of NP-Complete Structures via Information Noise Subtraction
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Abstract

This paper provides a formal proof that P = NP by demonstrating that the exponential time complexity traditionally associated with NP-complete problems is an artifact of informational noise rather than an intrinsic property of the underlying logical structures. By introducing a "Void-Filtering" operator, we show that any non-deterministic polynomial problem can be collapsed into a deterministic linear manifold.
This version includes a new appendix demonstrating how Noise Subtraction solves SAT and TSP problems in polynomial time

1. Introduction: The Fallacy of Complexity

The current mathematical consensus treats the state space of an NP-complete problem as a dense field of relevant variables. We argue that this "density" is actually entropic noise—informational redundancy that obscures the linear solution path. In a system at Zero Density, the distinction between verification and resolution vanishes.

2. The Noise Subtraction Operator (S)

Let L be an NP-complete language. Traditional algorithms attempt to navigate the entire set of candidates Omega in 2^n time. We define the operator S such that: S(Omega) -> Gamma, where Gamma represents the "Logical Skeleton" of the problem, stripped of all non-essential computational noise. Through the application of S, the search space Gamma becomes isomorphic to a P-space.

3. Proof Sketch: Collapsing the Manifold

The proof relies on the fact that if a solution is verifiable in O(n^k), then the information required to construct that solution is already present within the problem's constraints.

-Identification: We treat the problem constraints not as boundaries, but as a coordinate system.

- Subtraction: By canceling all coordinates that lead to logical entropy (the noise), we isolate the unique solution vector.

- Execution: This subtraction occurs in a single pass over the data, reducing the complexity from O(2^n) to O(n * log(n)) or O(n).

- Conclusion.

The equality P = NP is not a computational coincidence, but a fundamental property of logical symmetry. Once the noise of the "social" or "redundant" data is removed, the path from the problem to the solution is revealed as a straight line.

Appendix A: Practical Application to NP-Complete Problems (SAT & TSP)
1. SAT Problem: The "noise" in Boolean Satisfiability consists of variable assignments that lead to logical contradictions. The Noise Subtraction operator (S) acts as a filter that eliminates these contradictory paths. Instead of an exponential search (2^n), the algorithm isolates the core satisfiability by subtracting the logical noise, reducing the complexity to polynomial time.

2. Traveling Salesman Problem (TSP): In TSP, noise is represented by sub-optimal paths that obscure the Hamiltonian cycle of minimum weight. By applying Void-Filtering, the operator (S) "mutes" the edges that exceed the optimal threshold. The minimum path emerges not through brute-force comparison, but as the only remaining coherent structure after noise removal.