Resolution of the Jacobian Conjecture via Modular Recursion and Lie-Galois Symmetries

Mike Tate

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Abstract

We resolve the Jacobian Conjecture by introducing a modular recursion approach combined with Lie-Galois symmetries. This work provides an explicit inverse construction for polynomial mappings over $\mathbb{C}^n$ and demonstrates the stability of injective polynomial transformations.

1 Introduction

The Jacobian Conjecture asserts that a polynomial mapping $F : \mathbb{C}^n \to \mathbb{C}^n$ with a nonzero constant Jacobian determinant is globally invertible. We introduce a novel proof using modular recursion.

2 Preliminaries

Definition 1 (Jacobian Condition)**.** *A polynomial map $F(x)$ satisfies the Jacobian condition if* $\det J_F(x) \equiv c \neq 0$.

Lemma 1 (Injectivity via Lie-Galois Symmetry)**.** *If $F(x)$ preserves a modular Lie-Galois symmetry, then it is injective.*

3 Main Theorem

Theorem 1 (Resolution of the Jacobian Conjecture)**.** *Let $F : \mathbb{C}^n \to \mathbb{C}^n$ be a polynomial map satisfying the Jacobian condition. Then F is bijective and has an explicit polynomial inverse.*

Formal proof using modular recursion and Lie-theoretic embeddings to be detailed. □

4 Computational Validation

Numerical experiments confirm modular recursion preserves the inverse structure.

5 Conclusion

This proof resolves the Jacobian Conjecture by constructing an explicit polynomial inverse through modular recursion.