

Riemann Effective Weil Witness and Li Program

RIEMANN HYPOTHESIS STATUS: UNSOLVED / IN PROGRESS

Program status: **ACTIVE RESEARCH — TARGET OPEN**

Research question

Can a rigorously specified, independently checkable Weil-form evaluator or a quantitative Li-criterion route produce meaningful evidence toward the exact target that every nontrivial zero of the Riemann zeta function has real part $1/2$? The program also asks a research-engineering question: can ambitious mathematical exploration stop cleanly when a certificate contract is ambiguous, without promoting a rejected computation into a theorem claim?

Contribution and current result

No proof or disproof of the Riemann Hypothesis was produced. The current v3 result is a precise process obstruction under a contract frozen before implementation: the dependency schema admitted two plausible, incompatible encodings, one used by the producer and one required by the checker. Because choosing an interpretation after seeing both implementations would add post-freeze semantics, the route stopped as `STOPPED_WITH_PRECISE_FROZEN_CONTRACT_OBSTRUCTION`.

A parallel, context-separated lane produced an internal A.1-to-Hermitian-Weil-form bridge candidate matching the inherited conventions for zeros, poles, prime powers, archimedean terms, reflection, conjugation, and transforms. Its status remains `CHECKED_DERIVATION / SEPARATE_CONTEXT / CANDIDATE`. The quantitative Li route remains active at priority two.

Methods

The laboratory separates immutable sources, exploratory routes, computation, blind reconstruction, independent implementation, formalization attempts, audits, and handoff packets. Work uses frozen pre-source contracts, bounded repair budgets, content hashes, append-only claim and correction records, interval/exact arithmetic tooling, proof-carrying certificate designs, mutation controls, and strict replay gates. Claim validity, computational acceptance, scope, prior art, formalization, external review, and global-target completion remain separate status dimensions.

Zackary's role

Zackary is the human research director and authorization holder. He fixed the exact target, required source and status discipline, bounded the allowed repair process, and retained authority over fresh-route authorization, external contact, publication, and public claims. The recorded workflow did not permit a stopped route to rewrite its own contract.

AI and tool role

AI agents assisted with route generation, formal statement work, producer and checker implementations, adversarial review, obstruction analysis, and checkpoint drafting. Git, structured YAML/JSON ledgers, exact rational and interval arithmetic, Python verification, and a Lean toolchain supported the environment. Same-project AI lanes are not represented as external independence or proof-assistant certification.

Verification

The schema-obstruction claim is checked and complete only at `PROCESS_ONLY` scope. The rejected producer's mathematics remains unassessed because its implementation never passed the contract. No baseline certificate, N01–N10 dependency chain, required mutation suite, or strict replay was accepted. The bridge candidate has no formalization or external specialist review.

Exact nonclaims

There is no RH proof, disproof, certified off-line zero, accepted negative Weil entry, or global positivity mechanism. Zero-containing numerical rectangles confer no negativity or RH authority. The A.1 bridge is a candidate, not a theorem-level advance accepted by external review. ETI process discipline is not a mathematical premise for RH.

Public artifacts

None yet. The laboratory and checkpoint are private; no approved public summary or repository was found.

Employer relevance

This program demonstrates disciplined work under extreme uncertainty: formal problem decomposition, certificate-oriented computation, independent checking, immutable contracts, negative-result preservation, and principled stopping. Those capabilities transfer directly to formal methods, verification, research engineering, high-assurance AI, and complex technical program management.