# Evaluation of the Masullo Human-Written Proof of the Generalized Riemann Hypothesis in Meth8/VŁ4

**Colin James III**
Ersatz Systems, Colorado Springs, CO
info@cec-services.com
November 22, 2026

**Copyright © 2026 Colin James III. All rights reserved.**

## Abstract

Alessandro Maria Masullo posted a draft manuscript, The Music of the Primes, on November 20, 2026. Ravi Vakil announced it as a proposed proof of the Generalized Riemann Hypothesis (GRH), and the author states that no AI took part. John Baez describes the manuscript as 940 pages. This paper presents the reported claims, maps their propositional structure to the Meth8/VŁ4 quad-valent modal logic, and evaluates each formula by truth table, including necessity (#) renderings. In every formula tested, only the argument form of modus ponens over the two analytic premises is a tautology. All other claims, including every # rendering, are non-tautologous. In Meth8 terms the release and its assertion are not by themselves a theorem. The conclusion depends on two premises: that the trace-formula computation of the geometric side is correct, and that the uniform bound in the cutoff limit holds. Reviewers contest both. Meth8 evaluates propositional structure only. It does not check the mathematics.

## 1. Claims as reported

The following claims appeared between November 20 and November 22, 2026. They come from Vakil's announcement and Baez's summary, not from a reading of the full manuscript.

- Result. Vakil's post announces a proposed proof of GRH by Masullo [1]. The plain Riemann Hypothesis (RH) follows as the special case of the zeta function [2].
- Authorship. The author states that a human wrote the proof entirely, with no AI [1].
- Document. The draft carries the title The Music of the Primes. Baez calls it a 940-page human-written manuscript [2]. No source reviewed gives a count of 918 pages.
- Setting. Masullo works with functions on the idele class group of a number field. Each test function φ gives an operator A(φ) by convolution, which follows Connes's approach [2].
- Trace formula. The spectral side sums over zeros of the Hecke L-function. The geometric side integrates a kernel over the diagonal, and most of the manuscript computes that integral by a new route [2].
- Prime-by-prime evaluation. Poisson summation removes the contribution of each sufficiently large prime for a test function supported on $t > 1$. Connes's local trace formula handles the finitely many remaining primes [2].
- Key test function. The choice $\varphi_z(t) = t^{(-z)}$ for $t > 1$ reproduces the explicit formula for $L'/L$. This step alone adds nothing new [2].
- No positivity route. Masullo states that Weil's Positivity Criterion plays no role [2].

- Limiting step. Smooth, compactly supported cutoffs increase to the indicator of $(1, \infty)$. The claim holds that the geometric side stays uniformly bounded on compact sets to the right of $\mathrm{Re}(z) = 1/2$. Montel's theorem then yields a holomorphic limit, so $L'/L$ has no poles and $L$ has no zeros with $\mathrm{Re}(s) > 1/2$. The functional equation excludes zeros with $\mathrm{Re}(s) < 1/2$, so every nontrivial zero lies on $\mathrm{Re}(s) = 1/2$ [2].

## 2. Verification status

At the time of writing, reports conflict, and the status stays unsettled.

- Brian Conrad examined the draft for months, gave extensive feedback that Masullo is incorporating, and finds it *"looking good"* so far [1].
- The original plan had Conrad work with Masullo for a year before any announcement. The post releases the draft early instead [1].
- About eight hours after the announcement, an update reported that several people had flagged problems, found with help from different AI models. The post says the community must see every issue resolved before accepting the proof [1].
- One reviewer argues that a limit used for the prime 2 evaluates to 0 where the argument predicts log 2 [2].
- Another reviewer claims that a basis statement on page 444 fails for Markushevich bases, and that later parts may depend on it [2].
- Chapter 13, where the manuscript should deduce GRH, holds only placeholders [2].
- The same day, Levent Alpöge released a separate AI-assisted Lean claim. The companion paper in this series evaluates that release [3].

## 3. Method: Meth8/VŁ4

Meth8/VŁ4 is a quad-valent modal logic with the values F, N, C and T. Only T validates a tautology, and a theorem is a formula whose truth table is all T [4]. This paper follows the same conventions as the companion paper on the Alpöge release:

- Propositional variables (p, q, r, s, t) take values F and T only. N and C arise only through connectives and modal operators.
- Truth tables list 32 rows, with p varying fastest and F before T. Tables print in groups of four rows.
- The possibility operator % maps F to C, C to C, N to T and T to T. The necessity operator # maps F to F, C to F, N to N and T to N.
- The rendering #X = (s=s) tests X for necessity. Because # never returns T, no # rendering can validate, so only the plain form of a formula can serve as a theorem.
- A non-tautologous result counts as a refutation of the claimed theorem.

Copyright © 2026 Colin James III. All rights reserved. 

## 4. Mapping the claims

Five atoms carry the propositional structure. The mapping parallels the companion paper so the two evaluations compare directly.

- p = the draft manuscript was released (posted November 20, 2026).
- q = Masullo claims a proof of GRH, written by a human.
- r = the trace-formula computation of the geometric side is correct (Section 1, setting through prime-by-prime evaluation).
- s = the uniform bound in the cutoff limit holds (Section 1, limiting step).
- t = GRH is proved.

Premise (r&s)>t carries the remaining steps: Montel's theorem, the holomorphic limit and the functional equation. This paper treats that bridge as granted from the description in [2]. It does not check the bridge independently. Table 1 names each formula.

| ID | Reading |
|---|---|
| A1 | Released and claimed |
| A2 | Release and claim imply proof |
| A3 | Release and claim imply possible proof |
| A4 | Release and claim imply possibly sound computation and bound |
| A5 | Sound computation and bound imply proof |
| A6 | Sound computation and bound imply possible proof |
| A7 | Possibly sound computation and bound implies possible proof |
| A8 | Modus ponens on the two analytic premises |
| A9 | GRH proved |
| A10 | GRH possibly proved |

*Table 1. Formula identifiers.*

## 5. Results

Table 2 lists each formula in plain form with its 32-row result, p varying fastest, and the count of T rows.

| ID | Formula | 32-row result | T count |
|---|---|---|---|
| A1 | `p&q` | `FFFT FFFT FFFT FFFT FFFT FFFT FFFT FFFT` | 8/32 |
| A2 | `(p&q)>t` | `TTTF TTTF TTTF TTTF TTTT TTTT TTTT TTTT` | 28/32 |
| A3 | `(p&q)>%t` | `TTTC TTTC TTTC TTTC TTTT TTTT TTTT TTTT` | 28/32 |
| A4 | `(p&q)>%(r&s)` | `TTTC TTTC TTTC TTTT TTTC TTTC TTTC TTTT` | 26/32 |
| A5 | `(r&s)>t` | `TTTT TTTT TTTT FFFF TTTT TTTT TTTT TTTT` | 28/32 |
| A6 | `(r&s)>%t` | `TTTT TTTT TTTT CCCC TTTT TTTT TTTT TTTT` | 28/32 |
| A7 | `%(r&s)>%t` | `TTTT TTTT TTTT CCCC TTTT TTTT TTTT TTTT` | 28/32 |
| A8 | `((((r&s)>t)&r)&s)>t` | `TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT` | 32/32 |

Copyright © 2026 Colin James III. All rights reserved. 

| ID | Formula | 32-row result | T count |
|---|---|---|---|
| A9 | t | FFFF FFFF FFFF FFFF TTTT TTTT TTTT TTTT | 16/32 |
| A10 | %t | CCCC CCCC CCCC CCCC TTTT TTTT TTTT TTTT | 16/32 |

*Table 2. Plain truth tables.*

Table 3 lists the necessity renderings #X = (s=s) over the same 32 rows.

| ID | Formula | 32-row result |
|---|---|---|
| A1 | #(p&q)=(s=s) | FFFN FFFN FFFN FFFN FFFN FFFN FFFN FFFN |
| A2 | #((p&q)>t)=(s=s) | NNNF NNNF NNNF NNNF NNNN NNNN NNNN NNNN |
| A3 | #((p&q)>%t)=(s=s) | NNNF NNNF NNNF NNNF NNNN NNNN NNNN NNNN |
| A4 | #((p&q)>%(r&s))=(s=s) | NNNF NNNF NNNF NNNN NNNF NNNF NNNF NNNN |
| A5 | #((r&s)>t)=(s=s) | NNNN NNNN NNNN FFFF NNNN NNNN NNNN NNNN |
| A6 | #((r&s)>%t)=(s=s) | NNNN NNNN NNNN FFFF NNNN NNNN NNNN NNNN |
| A7 | #(%(r&s)>%t)=(s=s) | NNNN NNNN NNNN FFFF NNNN NNNN NNNN NNNN |
| A8 | #(((((r&s)>t)&r)&s)>t)=(s=s) | NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN |
| A9 | #t=(s=s) | FFFF FFFF FFFF FFFF NNNN NNNN NNNN NNNN |
| A10 | #%t=(s=s) | FFFF FFFF FFFF FFFF NNNN NNNN NNNN NNNN |

*Table 3. Necessity renderings.*

## 6. Discussion

- Only A8 is a theorem. The argument form ((((r&s)>t)&r)&s)>t is T in all 32 rows. Once the bridge premise (r&s)>t, the computation r and the bound s hold, t follows.
- Release plus assertion is not proof. A2 and A3 fail in rows where p and q hold but t does not, and A4 fails where p and q hold but r and s do not both hold. Posting a manuscript and claiming a proof does not settle that the computation is correct or that the bound holds.
- The bridge is not a theorem. A5 fails in the rows where r and s hold and t does not. A5 becomes usable only as a premise, so the argument leans on the bridge exactly where the reviewers raise objections.
- # merges F and C. A5 and A6 differ in plain form (F against C in the failing group), but both give identical # results. Likewise A9 and A10 give identical # results.
- No # rendering validates. Each # form yields N where X is T and F where X is F or C, so none reaches T.
- The premises carry the weight. Reviewers contest r through the prime 2 limit and the page 444 claim. Chapter 13, where the manuscript should deduce GRH, holds placeholders, so the bridge premise lacks a written deduction. Meth8 cannot settle any of these points, because it sees only the propositional skeleton.

Copyright © 2026 Colin James III. All rights reserved. 

## 7. Conclusion

In Meth8/VŁ4, the Masullo draft and its assertion are not a theorem. Only the argument form of modus ponens over the analytic premises validates. The proof of GRH stands or falls with two mathematical premises: the correctness of the geometric-side computation and the uniform bound in the cutoff limit. Reviewers contest both, the author calls the manuscript an unfinished draft, and Chapter 13 holds only placeholders. As of this writing, the Meth8 evaluation yields no confirmation of the proof. It confirms only that the stated chain has a valid form.

## Note on preparation

Claude, an AI model, assisted in drafting this paper. A short script computed the truth tables with the connective, necessity and possibility tables used in the companion paper. The script and the paper both treat the published claims as secondary reports and do not read the manuscript itself.

## References


[1] R. Vakil, “Hurried announcement: Alessandro Masullo, GRH,” Math 216 blog, November 20, 2026. https://math216.wordpress.com/2026/11/20/hurried-announcement-alessandro-masullo-grh/

[2] J. Baez, “Masullo on the Riemann Hypothesis,” Azimuth, November 22, 2026. https://johncarlosbaez.wordpress.com/2026/11/22/masullo-on-the-riemann-hypothesis/

[3] C. James III, Evaluation of the Alpöge–Claude Riemann Hypothesis Lean Release in Meth8/VŁ4, November 20, 2026.

[4] C. James III, Meth8/VŁ4 System Description. https://ersatz-systems.com/Grok3b.description.M8VL4.pdf

[5] A. M. Masullo, The Music of the Primes (draft manuscript). https://math216.wordpress.com/wp-content/uploads/2026/11/the-music-of-the-primes.pdf


Copyright © 2026 Colin James III. All rights reserved. 