Brief Report

Volume 13:1, 2022

Journal of
Physical Mathematics

ISSN: 2090-0902

Open Access

The Pros and Cons of Riemann Hypothesis: An Overview

Bennett Brown*

Department of Physics, University of South Florida, Tampa, USA

Brief Report

The Riemann hypothesis is a basic mathematical conjecture with far-reaching consequences for the rest of mathematics. It's the basis for a lot of other arithmetic concepts, but no one knows if it's true. Its validity has become one of mathematics' most renowned open issues. The Riemann hypothesis has a reputation for being carefully noncommittal in mathematical writings. Most authors, such as Riemann and Bombieri, who offer a view, suggest that they assume (or at least hope) that it is correct. Ivi, who provides some reasons for scepticism, and Littlewood, who plainly asserts that he believes it is wrong, that there is no proof for it, and that there is no possible reason it might be true, are among the few authors who express genuine doubt about it. The evidence for it is strong but not overwhelming, according to the survey articles, thus while it is probably true, there is reasonable doubt.

Sarnak, Conrey, and Ivi present some of the reasons for and against the Riemann hypothesis, which include the following: The Riemann hypothesis has several parallels that have been proven. Deligne's demonstration of the Riemann hypothesis for varieties over finite fields is perhaps the single most compelling theoretical argument in favors of the hypothesis. This strengthens the argument that all zeta functions associated with automorphic forms meet the Riemann hypothesis, which includes the traditional Riemann hypothesis as an example. Selberg zeta functions, like the Riemann zeta function, satisfy the counterpart of the Riemann hypothesis and are comparable to it in several aspects, with a functional equation and an infinite product expansion equivalent to the Euler product expansion.

However, there are some significant distinctions, such as the fact that they are not provided by the Dirichlet series. For the Goss zeta function, Sheats verified the Riemann hypothesis. Despite having an unlimited number of zeros on the critical line, some Epstein zeta functions do not meet the Riemann hypothesis, in contrast to these positive instances. These functions are similar to the Riemann zeta function in that they contain a Dirichlet series expansion and a functional equation, but the ones that are known to violate the Riemann hypothesis lack an Euler product and are unrelated to automorphic representations. At first glance, the numerical verification that there are numerous zeros on the line appears to be significant proof.

However, many conjectures in analytic number theory that were backed by considerable numerical evidence turned out to be wrong. For a well-known example, see Skewes number, where the first exception to a plausible conjecture related to the Riemann hypothesis most likely occur around 10316; a counterexample to the Riemann hypothesis with an imaginary part this size would be far beyond anything currently computed using a direct approach. The issue is that behavior is frequently influenced by very slowly increasing functions like log T, which tend to infinity but do so slowly that computation cannot detect them. The theory of the zeta function, which controls the behavior of its zeros, contains such functions [1-5].

References

1. Bombieri, Enrico. "Complements to Li's criterion for the Riemann hypothesis." *J Numb Theory* 77 (1999): 274-287.
2. Li, Xian-Jin. "The positivity of a sequence of numbers and the Riemann hypothesis." *J Numb Theory* 65 (1997): 325-333.
3. Omar, Sami, and Saber Bouanani. "Li's criterion and the Riemann hypothesis for function fields." *Finite Fields Their Appl* 16 (2010): 477-485.
4. Omar, Sami. "On the Li coefficients for the Hecke L-functions." *Math Phy Analy Geom* 17(2014): 67-81.
5. Bombieri, Enrico. "Counting points on curves over finite fields." *Seminaire Bourbaki* (1974): 234-241.

How to cite this article: Brown, Bennett. “The Pros and Cons of Riemann Hypothesis: An Overview.” J Phys Math 13 (2022): 355

***Address for Correspondence:** Bennett Brown, Department of Physics, University of South Florida, Tampa, USA, e-mail: bennettbrown@mathphy.us*

Received: 03 January, 2022, Manuscript No. jpm-22-55755; **Editor Assigned:** 05 January, 2022, PreQC No. P-55755; **Reviewed:** 17 January, 2022, QC No. Q-55755; **Revised:** 23 January, 2022, Manuscript No. R-55755; **Published:** 28 January, 2022, DOI: 10.37421/2090-0902.22.13.355