One page Proof of Riemann Hypothesis

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Abstract

There are tenths of proofs for Riemann Hypothesis and 3 or 5 disproofs of it in arXiv. I am adding to the Status Quo my proof, which uses the achievement of Dr. Zhu.

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I. PRIOR RESEARCH RESULT

Because the paper of Dr. Zhu [1] is not published in a peer-review journal (for 4 years) and is very complicated, it could contain a fatal mistake. Thus, I do not start with the final result called "The probability of Riemann's hypothesis being true is equal to 1" but rather with the starting information of the papers [1, 2] (one of the papers is peer-reviewed), where is proven, that

$$\lim_{n\to\infty} \inf d(n) = 0\,, \tag{1}$$

where $d(n) = D(n)/n$, and $D(n) = \mathrm{e}^{\gamma}\, n \ln\ln n - \sigma(n)$. Hereby the Riemann Hypothesis holds true, if $\lim_{n\to\infty} \inf D(n) \geq 0$.

II. MY PROOF

The Eq.(1) means, that $\lim_{n\to\infty} d(n) \geq 0$. However, the limit does not exist, because the number $X = \lim \sigma(n)/n$ can not be determined: the function jumps from one value to another, namely $(\sigma(n) - \sigma(n+j))/n \neq 0$ if $n \to \infty$ for $j < \infty$. Therefore, instead of Eq.(1) it is mathematically correct to write: $d(n) = D(n)/n \geq 0$, when $n \gg 1$. The expression $n \gg 1$ means, that the n is always finite $n < \infty$. But for any finite n the $D(n)/n \geq 0$ implies, that $D(n) \geq 0$.

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[1] Yuyang Zhu, The probability of Riemann's hypothesis being true is equal to 1, arXiv:1609.07555v2 [math.GM] (2018)

[2] P. Solé and Y. Zhu. An Asymptotic Robin Inequality. INTEGERS, Nr.A81, 16 (2016), http://math.colgate.edu/∼integers/q81/q81.pdf