

from garry.herrington@gmail.com , 31 July 2017 (corrected version)

Problem with a Claimed Proof of the Riemann Hypothesis

> Grytczul 2012

Grytczul 2012 claims a proof of a statement that is shown in Robin 1984 to be equivalent to the Riemann Hypothesis. The claimed proof depends on Lemma 5 in Grytczul 2012, which states:

"Let $n = 2m_1$, $(2, m_1) = 1$ and $\omega(m_1) = 2$. Then for all integers $2m_1 > \exp \exp(9)$ we have

$$(2.12) \quad I(m_1) < 50/51."$$

where $m_1 = p_1^{\alpha_1} p_2^{\alpha_2}$ and, by equation (2.13), $I(m_1) = (1 - p_1^{-\alpha_1 - 1})(1 - p_2^{-\alpha_2 - 1})$

By making both of (p_1, p_2) and/or both of (α_1, α_2) arbitrarily large then $I(m_1)$ can be made arbitrarily close to 1.

Lemma 5 is therefore false.

The proof of Lemma 5 is based on a statement (2.15) which has the form $A \rightarrow B$. It seems A and B are both true separately but B is not a necessary condition for A and hence the implication $A \rightarrow B$ is false.

References

Grytczuk, A., 2012, "Robin's Inequality for Sum of Divisors Function and the Riemann Hypothesis", Journal of Informatics and Mathematical Sciences, Vol 4 (2012), Number 1, pp 15-21.

Robin, G., 1984, "Grandes Valeurs de la Fonction Somme des Diviseurs et Hypothèse de Riemann", J. Math. pures et appl., 63, 1984, pp 187-213

End