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Correction to: "On a positivity property of the Riemann ξ-function"

(Acta Arith. 89 (1999), 217–234)

by

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In my paper [1] Lemma 3.1 is incorrectly stated. It should read as follows:

Lemma 3.1 (Unconditional). *For $\sigma_0 \neq 0$, the condition*

$$\frac{1}{\sigma_0^2 + (\gamma+t)^2} + \frac{1}{\sigma_0^2 + (\gamma-t)^2} \geq \frac{2}{\sigma_0^2+\gamma^2} \tag{3.3}$$

holds if and only if either $t = 0$ or

$$3\gamma^2 \geq \sigma_0^2 + t^2. \tag{3.4}$$

The cases of equality coincide.

Proof. If $t = 0$ equality holds so we may assume $t \neq 0$. Since $\sigma_0 \neq 0$ no denominator vanishes, so we can clear denominators, to find that (3.3) is equivalent to

$$(\sigma_0^2+\gamma^2)(2\sigma_0^2 + 2t^2 + 2\gamma^2) \geq 2(\sigma_0^2 + (\gamma+t)^2)(\sigma_0^2 + (\gamma-t)^2).$$

Dividing by two and simplifying yields

$$3\gamma^2 t^2 \geq \sigma_0^2 t^2 + t^4.$$

Since $t \neq 0$ we can divide by t^2 to obtain (3.4). All steps are reversible. ∎

Lemma 3.1 is applied in Lemma 3.2 of [1], where we note that equation (3.6) follows from the corrected form of Lemma 3.1.

Finally, in the equation (3.8) of [1] the term on the right $-\frac{1}{s-1}$ should have its sign reversed, to $\frac{1}{s-1}$.

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References

[1] J. C. Lagarias, *On a positivity property of the Riemann ξ-function*, Acta Arith. 89 (1999), 217–234.

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