Review of: "Mathematics Is Physical"

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This is my opinion about the paper *Mathematics is Physical*,

by Biao Wu, to be published in **Qeios**

The idea that there are uncountably many mathematical assertions does not have much to do with Gödel's theorem. Take a contradiction, e.g., 1=0. It is not provable in mathematics, if mathematics is consistent, of course. So what.

Physics is not real life. Mathematics and Physics are tools which improve our lives on Earth. Physics is a product of the human brain. Therefore, Physics is Biology, and so on. I have no idea how such arguments prove that mathematics is *inherently physical*.

Also, there are uncountably many real numbers and the language is countable. Therefore, there are real numbers which are not definable. Does this say something about the physicality of mathematics? Not much. See the first pages of the paper of Joel Hamkins: https://arhiv.org/pdf/1105.4597.pdf.

Sometimes in the 80s Pour El & Richards proved the following theorem: evolution of computable function through the wave equation may lead to an uncountable (in the sense of Turing) result. Modern approaches to such problems are e.g., Type-2 Theory of Effectivity. By the way, it is not straightforward to prove that wave machines have more power than Turing machine.

The author of the paper writes about physicality. The question is *in which universe?* Namely, it turns out that in some models of Theory of Relativity, in so called Malament-Hogarth spacetimes, one can check e.g., Goldbach conjecture. Hence, the concept of computability may depend on the physical universe in which we construct Turing machine. See the papers of Istvan Nemeti.

I leave it to you, dear friends, to decide what to do with the paper you sent to me for an opinion.

All the best,

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