Review of: "Mathematics Is Physical"

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This article claims that mathematics is physical because mathematicians and computers (humans and machines) use physical manipulations. This thesis seems essentially correct insofar as computation is concerned, but it does not really address what happens if the truth of a proposition is not computationally decidable. Personally I believe that a hypercomputational perspective is needed to maintain the physicality of the computing process, although hypercomputation is by definition not physically tractable. The article could do more to address the (standard) claim that mathenatics is about abstract objects.

What the article is in practice is a basic conceptual survey of Turing machines, quantum versus classical mechanics and Godel's first incompleteness theorem (sort of). Didactically I think it is quite good; I liked the argument for why a classical computer is up to exponentially slower than a quantum computer, and the argument why all mathematical propositions could be not be enumerated. But it is worth noting that a quantum computer can only output one answer for all computations on superpositions of states (so a quantum computer does not by default do exponential speed up of a classicial computation), and that Godel's incompleteness theorem can be thought of as a consequence of the fact that “is provable in axiomatic theory T” can be encoded as an arithmetical predicate and “a proof” can be encoded as a number, so that “I am not provable” corresponds to a universally quantified arithmetic proposition.

In terms of structure, there is a lot of repetition, particularly about Godel's incompleteness theorem. The author needs to decide whether the paper is primarily.a didactic piece aimed as an introduction to computation theory, or whether it is a philosophical paper addressing the problem of asbtract mathematical objects (whether sets or lambda terms).