Newton's Limit operator has no sense

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Abstract

The Limits and infinitesimal numbers were invented by the fathers of Science like Newton and Leibniz. However, a hypothetical being from another star system could have developed more realistic mathematics [in my opinion the mathematics should be defined via numbers of our fingers and the actions (like adding) with them]. In this note, I am showing the paradox of the current version of "highest mathematics".

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Suppose the ϵ is an infinitisemal number. Thus, by the definition is is non-vanishing

$$\epsilon \neq 0 \tag{1}$$

but very small $\epsilon \ll 1$. Then the Limit

$$L := \lim_{x \to 0} x \tag{2}$$

is defined as [1]

$$L := \epsilon\,, \quad \epsilon \ll 1\,. \tag{3}$$

From this definition and Eq.(1), the $L \neq 0$. Nevertheless, they put "by hand" the $L = 0$. [1] For what reason? Currently, it is a violation of the Principle of Sufficient Reason. [2]

Discussion

One can think, that in mathematics exists minimal possible number, thus $0 \equiv \epsilon$. But I disagree, because if such a number exists, then there is no smaller non-vanishing number; however the exact zero is the separate number, so $0 \neq \epsilon$.

The infinitesimal numbers are connected with the unlimited numbers via $M = 1/\epsilon$. And if the infinitesimal numbers have no sense, then there should be a paradox in unlimited numbers as well. It is Hilbert's "Infinite Hotel Paradox": on one hand, the hotel is full, but on the other hand, it is not full, because it can accept new guests. [3]

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[1] DeBaggis, Henry F.; Miller, Kenneth S. (1966). Foundations of the Calculus. Philadelphia: Saunders; Boyer, Carl B. (1959). The History of the Calculus and its Conceptual Development. New York: Dover; Bardi, Jason Socrates (2006). The Calculus Wars : Newton, Leibniz, and the Greatest Mathematical Clash of All Time. New York: Thunder's Mouth Press.

[2] Freeman, Charles (1999). The Greek Achievement: The Foundation of the Western World. Allen Lane. p. 152.

[3] Hilbert, David (2013), Ewald, William; Sieg, Wilfried (eds.), David Hilbert's Lectures on the Foundations of Arithmetics and Logic 1917-1933, Heidelberg: Springer-Verlag; Kragh, Helge (2014). "The True (?) Story of Hilbert's Infinite Hotel". arXiv:1403.0059