

$1/0 = 0/0 = \text{refuted!}$

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Abstract

Saitho's equality $(1/0)=(0/0)$ is self-contradictory and refuted.

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1. Introduction

Needless to say, we all may have false beliefs and can make some mistakes. Roughly, errors in human reasoning may involve bad arguments, incorrect starting points of proofs, incorrect explanations or definitions and other erroneous products of human reasoning. The list of fallacious arguments and methods is very long and contains more than 200 known common fallacies. The first known systematic study of fallacies is ascribed to *Aristotle's De Sophisticis Elenchis* (Sophistical Refutations). Some of the fallacies, which should not be persuasive but they often are, are created unintentionally, while other are created intentionally in order to deceive people. Still, not all scientists seem equally susceptible to fallacies when fallacies make their way into the science. Fallacious arguments generate knowledge of none or of limited value and reduces science into pure believe. In order to take science seriously and to be able to solve real-world challenges it is necessary to identify fallacies as soon as possible thus that the same fallacies cannot make any harm in science. Thus far, charging someone of fallacious reasoning always need to be justified in detail and if possible by a formal scientific mathematical proof but without lapsing itself into absurdity.

2. Material and Methods

2.1. Definitions

DEFINITION 1. (NUMBER +0)

Let c denote the speed of light in vacuum, let ε_0 denote the electric constant and let μ_0 the magnetic constant, let i denote an imaginary number (Bombelli, 1579). The number $+0$ is defined as the expression

$$\begin{aligned} +0 &\equiv (c^2 \times \varepsilon_0 \times \mu_0) - (c^2 \times \varepsilon_0 \times \mu_0) \\ &\equiv +1 - 1 \\ &\equiv +i^2 - i^2 \end{aligned} \quad (1)$$

while “=” denotes the equals sign or equality sign (Robert Recorde, 1557) (Rolle, 1690) used to indicate equality and “-” (Widmann, 1489) (Pacioli, 1494) (Robert Recorde, 1557) denotes minus signs used to represent the operations of subtraction and the notions of negative as well and “+” (Widmann, 1489; Pacioli, 1494; Recorde, 1557) denotes the plus signs used to represent the operations of addition and the notions of positive as well.

DEFINITION 2. (NUMBER +1)

Let c denote the speed of light in vacuum, let ε_0 denote the electric constant and let μ_0 the magnetic constant, let i denote an imaginary number (Bombelli, 1579). The number $+0$ is defined as the expression

$$+1 \equiv (c^2 \times \varepsilon_0 \times \mu_0) \equiv -i^2 \quad (2)$$

DEFINITION 3. (SAITHO’S NCORRECT DEFINITION OF ZERO)

Saburou Saitoh (Saitoh, 2019) defines 0 as

$$\frac{+1}{+0} \equiv +0 \quad (3)$$

and equally as

$$\frac{+0}{+0} \equiv +0 \quad (4)$$

DEFINITION 4. (SAITHO’S EQUALITY)

It is $+0 = +0$, Saitoh (Saitoh, 2019) comes to the conclusion based on his definition of zero is that

$$\frac{+1}{+0} \equiv \frac{+0}{+0} \quad (5)$$

2.2.1. Axiom I (Lex identitatis. Principium Identitatis. Identity Law)

In general, it is

$$+1 \equiv +1 \quad (6)$$

or the superposition of $+0$ and $+1$ as one of the foundations of quantum computing

$$+1 \equiv (1 + 0) \times (1 + 0) \times (1 + 0) \times (\dots) \times (1 + 0) \quad (7)$$

3. Results

THEOREM 3.1. (REFUTATION OF $1/0=0/0$)

CLAIM.

Saitho's approach to the division by zero is based on the logical contradiction

$$+1 = +0 \quad (8)$$

PROOF.

In general, taking axiom 1 not to be true, it is

$$+1 = +0 \quad (9)$$

which as such is obviously erroneous. This is the simplest mathematical form of Aristotle's law of contradiction (Barukčić, 2019). Saitho himself has never stated that his approach to the division by zero is grounded on a contradiction. Thus far, it is neither possible nor allowed to deduce Saitho's (Definition 4) equality $(1/0) = (0/0)$ from such an incorrect and fallacious starting point. Multiplying the starting point of this proof by $(1/0)$ we obtain

$$+1 \times \left(\frac{+1}{+0}\right) = +1 \times \left(\frac{+0}{+0}\right) \quad (10)$$

while we leave open the value of $(1/0)$. We obtain Saitho's equality as

$$\left(\frac{+1}{+0}\right) = \left(\frac{+0}{+0}\right) \quad (11)$$

QUOD ERAT DEMONSTRANDUM.

4. Discussion

The issue of division by zero as documented in literature appears to be as old as science itself. To date, we are on the edge to solve this and other fundamental problems of science and especially of mathematics itself. Still, the trials to approach to the solution of the problem of the division of zero by zero or other ‘indeterminate forms’ will not stay long lived if the same trials are grounded on a contradiction or a logical fallacy. While some authors are of the opinion that the division of zero by zero is solved in a logically consistent (Barukčić and Barukčić, 2016), way while respecting the *principium identitatis* as our common ground of science, other authors (Sen and Agarwal, 2016) disagree completely while Saitho (Saitho, 2009) himself prefers a logical contradiction as the foundation of his approach to the solution of the problem of the division by zero.

Saitho’s (Saitho, 2009) logically inconsistent approach to the division of zero by zero contradicts the basic secured foundations of science ($+1=+1$). Consistently with Saitho’s (Saitho, 2009) understanding of the division of zero by zero is that from his contradictory premise or statement ($+1=+0$, Equation 23), anything follows (**ex contradictione sequitur quodlibet**). In other words, whatever is claimed by someone who is relying on Saitho’s dictum concerning the division of zero by zero, its contradiction is also true. Karl Popper (1902 – 1994), as one of the 20th century’s greatest Austrian-British philosopher of science, stated correctly: “We see from this that if a theory contains a contradiction, then it entails everything, and therefore, indeed, nothing [...]. A theory which involves a contradiction is therefore entirely useless as a theory”. (Popper, 2002, p. 429). In this context, Saitho’s equality $(1/0) = (0/0)$ is self-contradictory, logically inconsistent and a completely useless approach to solve the problem of the division of zero by zero.

5. Conclusion

Saitho’s equality $(1/0) = (0/0)$ is refuted.

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