Perfect Symmetry
A Short Philosophical Note on Math Rebuilt from Ancient Atomism

Espen Gaarder Haug*

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Abstract

In this paper we point out an interesting asymmetry in the rules of fundamental mathematics between positive and negative numbers. We suggest an alternative (additional) number system rooted in ancient atomism; see, for example, Guthrie (1965); Pyle (1995); Taylor (1999); Grellard and Robert (2009). At several points in history, leading philosophers and scientists have thought that atomism could be the fundamental explanation of everything. Ancient atomism basically claims that everything consists of indivisible particles traveling in the void. If this is true, then we will see that everything comes in quanta (whole units) and fractional parts do not exist. Accordingly, in math developed from atomism there are no imaginary numbers.

Key words: Atomism, symmetry, imaginary numbers, $\sqrt{-1} = -1$, $\sqrt{-1} \neq i$.

Fundamental Math Developed from Ancient Atomism

There is a lack of symmetry in the basic rules of modern mathematics. When multiplying any positive real number with another positive real number, for example, the number stays positive. However, when we multiply a negative number by a negative number, the numbers suddenly flip their signs, becoming positive Multiplying two positive numbers retains the original sign, while multiplying two negative numbers flips the sign.

Next multiply any positive number with a negative number; the result is always a negative number. Why do negative numbers dominate over positive numbers when they are multiplied together and why does a negative numbers flip its sign when it is multiplied by another negative number? The reason could be that the fundamental understanding of math was developed at a time when we did not have a very deep understanding of this world. Wouldnt it be nice to have perfectly symmetrical mathematical rules that are identical for negative and positive numbers?

Assume that we can represent trees with positive numbers and women with negative numbers. Assume we now multiply 4 by -2; this gives us -8. Did we not just turn 4 trees into 8 women? That is impossible. Well, in fact, it is possible that we at some point could turn trees into women. After all, they both ultimately consist of molecules and atoms. Building blocks that can be moved around could, at least hypothetically, turn a tree into a woman and visa versa.

Assume that everything consists simply of indivisible particles and void. The indivisible particles are traveling continuously in the void. In this case, we only have two things: indivisibles and void. An area of space with place for one indivisible particle can only contain one indivisible particle or void. In a given area of space, the most efficient way to describe the numbers of indivisibles and the void space seems to only have real numbers and there is no need for zero. The numbers of indivisible particles can be represented by positive integers. Further, the number of areas not filled with indivisible particles can be represented by negative integers. For example, assume I choose -5 and 30. This would mean I am studying an area with space for 35 indivisible particles, but that there were 30 indivisible particles there and 5 void spaces. Then assume I have 4 indivisible particles and get 4 more, this is naturally equal to $4 \times 2 = 8$.

In modern mathematics, when we multiply -4×-2 we get 8. If -4 represents four void spaces and I multiply by -2 they cannot become 8, because that would be converting them all to indivisible particles. Void cannot turn into indivisible particles and indivisible particles cannot turn into void. We will therefore

*Corresponding author e-mail espenhaug@mac.com, Norwegian University of Life Sciences. Thanks to Victoria Terces for helping me edit this manuscript.

introduce the rule that negative numbers multiplied by negative numbers are still negative numbers. We will also introduce the idea that negative and positive numbers cannot mix.

In modern math, the square root of $\sqrt{-1}$ does not really exist, so one has to introduce imaginary numbers and say that $\sqrt{-1} = i$. Based on math developed in the form of atomism, we would have $-1 \times -1 = -1$ and the $\sqrt{-1}$ would be -1, just as the $\sqrt{1}$ is 1.

Under atomism, mathematical results could typically be represented as a pair of integers, with a negative integer representing the number of void spaces and a positive integer representing the number of indivisible particles. By such a system we could determine both the quantity of void spaces and the quantity of indivisibles. At the same time, we would also be characterizing what type of space area we are talking about. In such a system we have no need for fractions, as fractions cannot exist. There is also no need for zero or for imaginary numbers. We do not suggest that such a number system would be ideal for all applications. However, an atomist numbering system could potentially be ideal for describing the very fundament of reality. Some scientists would possibly claim that atomism was abandoned a long time ago due to its shortcomings. Haug has recently brought atomism back from a more pure philosophical perspective to direct application in mathematics and physics. Haug 2014 has recently shown, for example, that all of Einstein's mathematical end results in special relativity can be derived directly from the assumptions of atomism, at least when using conventional standard mathematics, see also Millikan (1924), G. (1932), Schrödinger (1954), Whyte (1961), Hayakawa (1965), Scott (1970), Schofield (1981), Furley (1983), Rüger (1988), Chalmers (2009b,a, 1997). Atomism has recently been linked to quantization and the theory of Max Planck 1901; 1906, see Fröhlich, Knowles, and Pizzo (2007) and Haug (2016). We encourage the reader to be skeptical, but still open minded enough to investigate a partly forgotten science, namely ancient atomism.

Perhaps it is no mistake that zero was a forbidden number in ancient times; maybe not because of the ignorance of ancient mathematicians, but rather because of their superior knowledge? Did they have superior knowledge in the terms of philosophy about the depth of reality, rooted in atomism?

How far could such an innovative number system take us? A system with only integers between minus infinity and plus infinity and excluding zero? With one numerical pair we could always describe any area of space. By looking at the world as a totally binary system at the very depth of reality we could possibly be better off through operating in a framework where we do not mix negative numbers with positive numbers.
We do not expect such a number system to be well-suited for all applications, but could it be the foundation of a new type of modern, yet also ancient math that could be used to resolve some unsolved problems?

We encourage both mathematicians and philosophers to think about the possibilities and limitations in such an alternative number system.

Do we really need negative numbers to dominate over positive numbers?

For what kinds of applications do imaginary numbers cause problems?

Are we simply using fractions because we are not yet able to detect and count the most fundamental sub-atomic particles that make up the universe?

These are among the questions at the center of a new philosophy of math and there is more work to come.

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