On "$1 \times 1 = 2$" by Terrence Howard and Its Implications: A Response

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Abstract

Throughout the course of human history, we have been plagued by intellectuals that look down upon the common man and his common sense. Once an intellectual gets a little bit of fame and, consequently, money, their mannerisms and affectations change noticeably, especially to those who have been with them since the beginning. They have, then, not been common since. This paper serves to expand on Mr. Howard's statement that $1 \times 1 = 2$ by both formalizing an algebraic structure and determining the natural endpoint of his line of reasoning.

1 Introduction

I think a fair number of people would more than likely dismiss Mr. Howard's work without even reading it seriously. This is fair, as he does not have any formal education either in physics or mathematics (or even psychology for that matter). Some might also say "1x1=2 has no practical application no matter how you spin it"[2]; this is, of course, completely correct. However, I have all of the time in the world as I am unemployed and bored. There is nothing inherently wrong with inventing new algebras, with their own unique rules and operations. We can look at Virasoro algebra, Heisenberg algebra, and Lie algebra as being three algebras all with their own algebraic structures. The problem begins when the logic within an algebra is both inconsistent and not properly defined.

Starting on Page 15 of Howard's unpublished book, we observe the statement that for all values of a, b, c $\in \mathbb{N}$,

$$a \times b = c$$

I will be taking all elements to exist within the set of natural numbers to simplify the argument. In doing so, we can further expand on the definition of 'product' within the context of his paper.

Firstly, Howard states that $1 \times 1 = 1$ is an “unfinished equation” because of the fact that there are two 1’s on the left-hand side of the equation, and one 1 on the right-hand side. He then defines the above equation as one of the “basic laws of common sense”, where “If $a \times b = c$, then c must be some ‘product’ of a and b.” There are two ways to define ‘product’ in the traditional sense. Firstly, the product of two natural numbers ‘a’ and ‘b’ can be defined by ‘a’ summed b-number of times. Secondly, we can define a commutative ring R, with the set S and the operations ‘+’ and ‘×’, where a and b are elements of the set S. It is clear that Mr. Howard defines multiplication with neither of these definitions, but instead fleshes out an entirely different definition.

2 Algebraic Structures

Howard makes a number of statements surrounding his algebra. Firstly, that “in order for 1×1 to equal 1 the value of either (a) or (b) has to be missing from the final product of (c)”. Secondly, “when [you do] 1×1, it is implied that 50% of the potential will be lost at their initial contact of these numeric entities [by the Principle of Implied Predictability of Loss]”. We will expand on the first statement.

2.1 Initial structure

The implication that Howard is making is that if $a \times b = 1$, then either a or b are 0; this is what is implied with the statement “missing from the final product of c (1)”. However, if a = b in the case of $1 \times 1 = 2$, then neither of them can be 0, contradicting Howard’s claim. We can deduce that the misunderstanding lies within the ‘×’ operator. Howard is defining the multiplication operator as “[adding] (a) to itself as many times as is indicated by units in (b)”. So,

$$(a \times b)_{\mathrm{H}} = a + \underbrace{a + a + \ldots + a}_{b\text{-times}} = c \quad \forall a \in \mathbb{N}$$

This is Howard’s algebra. The ‘×’ operator is defined as adding the first element, a, to itself b times. As such, we can see that,

$$(1 \times 1)_{\mathrm{H}} = (1^2)_{\mathrm{H}} = 1^2 + 1 = (1 \times 1) + 1 = 1 + 1 = 2$$

The structure of a Howard algebra is as follows:

$$(a \times b)_{\mathrm{H}} \equiv a \times b + a$$

Because we assume that addition doesn’t change in a Howard algebra, we can state, by the above definition, that "(1×1) and (1+1) both (=) 2". Howard states, on page 2, that 2×2 = 4. Within the context of a Howard algebra, this operation actually becomes 6: $(2\times2)_{\mathrm{H}} \equiv (2\times2) + 2 = 6$. Furthermore, let a, b, c $\in \mathbb{N}$, where a $\neq$ b. If we assume commutivity, then $(a \times b)_{\mathrm{H}} = (b \times a)_{\mathrm{H}}$ for all a, b $\in \mathbb{N}$. However, if $(a \times b)_{\mathrm{H}} = (a + a + \ldots + a) + b$ and $(b \times a)_{\mathrm{H}} = (b + b + \ldots + b) + a$, then $(a \times b)_{\mathrm{H}} \neq (b \times a)_{\mathrm{H}}$. More concretely,

$$(a\times b)_{\mathrm{H}} \equiv (\underbrace{a + a + \ldots + a}_{b\text{-times}}) + b = (a\times b) + b \neq (b\times a) + a = (\underbrace{b + b + \ldots + b}_{a\text{-times}}) + a \equiv (b\times a)_{\mathrm{H}}$$

Although the original statement that we begin with is inconsistent, we can still arrive at some technical fixes that legitimize the algebra. For example, if a = b, then the Howard product gives: $(a \times a)_{\mathrm{H}} = a^2 + a$ [1]. This fact can be extended to a specific pairing. The ordered pair (a,b)=(a,1) has the following relation for any a $\in \mathbb{N}$,

$$(a \times 1)_{\mathrm{H}} = (1 \times a)_{\mathrm{H}} + a^2 - a$$

Expanding this to any ordered pair (a,b), for any a, b $\in \mathbb{N}$,

$$(a \times b)_{\mathrm{H}} = (b \times a)_{\mathrm{H}} + a - b$$

2.1.1 Extension to real numbers

Consider the set of natural numbers with the Howard product, $\mathrm{G}(\mathbb{N}, \times_{\mathrm{H}})$. To be truly explicit, this is not a group. The Howard product is not associative, distributive, and a Howard algebra does not allow for an identity (which will be explored below). Howard, on page 19, fundamentally and unequivocally denies that there can be an identity element. You cannot truly form a group without an identity, and while the Howard product is a binary operator, $\mathrm{f} : \mathbb{N} \times \mathbb{N} \to \mathbb{N}$, (f is a mapping with respect to a Howard algebra), it is not associative. Because of this, the set of natural numbers with the Howard product can only form a magma.

Although the Howard algebra is not commutative, we can consider a mathematical structure where $[(1 \times 1) \times 1]_{\mathrm{H}}$ is the upper bound of the distance, and $[1 \times (1 \times 1)]_{\mathrm{H}}$ is the lower bound. If we extend the algebra to the real numbers $\mathbb{R}$, we can define a Howard division as being the opposite of a Howard product. For any arbitrary a, b, c $\in \mathbb{N}$, let $(a \times b)_{\mathrm{H}} = c$. Let '$/_{\mathrm{H}}$' be defined as the inverse of $\times_{\mathrm{H}}$. If multiplication is defined as the addition of 'a' to itself 'b' number of times, or ab+a, then division can be defined as follows:

$$(a \times b)_{\mathrm{H}} = c \to (c/a)_{\mathrm{H}} = b$$

$$ab + a = c \to ab = c - a \to b = \frac{c - a}{a} \equiv (c/a)_{\mathrm{H}}$$

Any rational number can be defined by $a = b/c$. If we substitute in this notation for $a = q/r$ and $c = s/t$, we get:

$$(c/a)_{\mathrm{H}} = \frac{rs - qt}{qt}$$

Inputting any natural number ensures that we can extend our algebra to the real numbers through the division operation.

2.1.2 On the geometric interpretation of 1^3

Howard, one page 124, defines the third power of one as being equal to the absolute value of π. He explains that in "3 Dimensional Space/Time the model of the Universe can be expressed in this single geometric equation". He continues that taking the third power of one allows it to expand and contract within itself in three dimensions, and that it is the "neutral condition of all visible matter", and that the equation is the reservoir of zero-point energy, as well as the center of a bubble. We can conclude, from Howard's paper, that this equation describes what he terms "the Lynchpin"[3]. The Lynchpin is a three-dimensional structure of six pentagons joined on two of each of their edges.

The equation describing the three-dimensional structure is as follow,

$$(1^3)_{\mathrm{H}} = (1 \times 1 \times 1)_{\mathrm{H}} = |\pi|$$

It is unclear if $|\pi|$ is the volume of the shape, the total length of the shape, or some number that is applied to the object abstractly. However, because Howard defines the structure as a quanta, we must assume that there is some geometric interpretation to the absolute value of π.

If we are to assume that one cubed is a three-dimensional structure, then it would follow that one squared is a two-dimensional structure. A two-dimensional Lynchpin, as defined by a Howard algebra, is equal to two. As Howard defines all of space and time as existing in three dimensions, we can state that there is no four-dimensional analogue to the Lynchpin, nor any higher dimensional analogue. As such, there is no need for exotic algebraic structures like Grassmannian algebra, as there is no need to generalize to any arbitrary number of dimensions.

If $(1^3)_{\mathrm{H}}$ is defined as the smallest possible structure in physical space, then it would follow that there are only a discrete, specifically whole number of possible lynchpins within some space. If one were to assume that there is some algebraic structure such that $1^2 = 2$ and $1^3 = \pi$ are consistent, we would have to first establish either left or right commutivity with respect to the multiplication operator. However, the Howard algebra is not commutative, as shown above. We must assume that there cannot exist any exponent greater than 3 in a Howard algebra, given his physical representation of algebra. Because of this, we must take the square and cube operators as being distinct operations in and of themselves.

Let a $\in \mathbb{N}^* = \{x \in \mathbb{N} | x \geq 1\}$. Generalizing the cubic equation to any natural number, we arrive at,

$$(a^3)_{\mathrm{H}} = a\pi \quad a \in \mathbb{N}$$

The equal sign with respect to a triple Howard product would transform the equal sign from an equivalent statement into a way to numerically represent multiple lynchpins.

2.2 Potential loss

The second statement revolves around a principle that Howard calls, "The Principle of Implied Predictability of Loss", where he states that for the statement $1 \times 1 = 1$, there is an implied 50% loss for the real value as defined by a Howard algebra. We can generalize this implied loss for any value in some Howard algebra as being c / c_{H}, where c_{H} is defined as the Howard product of a and b.

$$\frac{(a \times b)}{(a \times b)_{\mathrm{H}}} = \frac{c}{c_{\mathrm{H}}} \to 1 - \frac{1}{b+1} = \frac{c}{c_{\mathrm{H}}}$$

This implies,

$$\frac{c}{c_{\mathrm{H}}} = \left(1 - \frac{1}{b+1}\right) \to c_{\mathrm{H}} = \left(1 + \frac{1}{b}\right) c \to \left(1 + \frac{1}{b}\right) \equiv \Lambda$$

We can relate c_{H} and c by some this factor: $c_{\mathrm{H}} = \Lambda$c. Any solution in a Howard algebra can be related by this Λ factor. Notice that for b$\to$ 0, Λ approaches ∞, and as b$\to \infty$, Λ approaches 1. An interesting note is that, if Λ were raised to the b-power, we would be able to define the limit as b approached ∞ as e:

$$\lim_{b \to \infty} \Lambda^b = \lim_{b \to \infty} \left(1 + \frac{1}{b}\right)^b \equiv e$$

2.2.1 Potential loss extended to three dimensions

It can be argued that it is a complete waste of time to take Howard's arguments for one equation and put them into another equation, as he has his own formal logic for each individual argument he puts up. It is, in my opinion, important to not only combine the two separate thoughts, but to combine all thoughts, as any individual idea that fails within a set of ideas will fail the whole set. You cannot make statements like $1 \times 1 = 2$ and $1^3 = |\pi|$ independent of one another. They must be taken whole. For this reason, I will extend the concept of 'potential loss' to three dimensions. To find the potential loss for any natural number in some Howard algebra in three dimensions, we observe the ratio between the traditional algebraic structure and the Howard algebra,

$$\frac{a^3}{(a^3)_{\mathrm{H}}} = \frac{a^3}{a\pi} = \frac{a^2}{\pi}$$

3 Identity Element and Conservation of Energy

Howard continues the paper by going into an explanation about how some God-like figure left the concept of an identity element to steer humanity off-course. He goes on to describe how 1×1=1 predicts a "negatively discharging Universe without the ability to overcome [expanding (electro)magnetic radiation]". He describes the relationship between both of the ones on the LHS in terms similar to the behavior of particles in the electromagnetic field. His argument here is that both elements on the LHS, which we will henceforth term 1_{L} for the left-most 1 and 1_{R} for the right-most 1, do not 'couple' together with a traditional algebra, as the result is 1. According to Howard, for 1×1 to equal 1, 1_{L} would have to be repulsive when 1_{R} acts on it with respect to multiplication. He then further explains that 1 (both 1's, I'm assuming) would have to be a positive integer (note: $\mathbb{N}$) for gravity and electronic centripedal effects to "accumulate atoms of low potential together into systems of high potential [for particles to be able to bond and allow atomic structure]".

The consequence of this, Howard argues, is that the Universe would not be able to form, as particles could not bond to one another. An identity is any element where, when applied to another element in a set, that element remains unchanged. Because Howard fundamentally and unequivocally denies the existence of an identity, we have to assume that the element '0' cannot exist.

3.1 The electromagnetic field and multiplication

Consider the following argument:

Howard describes numbers as not analogous to particles, but as themselves particles. If we consider the set of natural numbers $\mathbb{N}$, and we count every element within the set, then we are met with the conclusion that, within the context of Howard's paper, there are infinite particles within the universe. If we limit each particle as being only able to occupy one physical location in space, where occupation is specifically quantized in such a way that there is a smallest possible distance, we will inevitably be left with more particles than there are unoccupied spaces in the Universe, if we assume a finite universe.

If we assume an infinite universe, we will still be met with a similar issue.

References

[1] Anonymous (2024) >>*16205751*, 4chan /sci/.

[2] Anonymous (2024) >>*16224644*, 4chan /sci/.

[3] "Lynchpin™." Lynchpin™, www.terryslynchpins.com/. Accessed 14 June 2024.