Reconstructing Mythic Algebra

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Abstract

This is the tenth in a series of papers on an algebra, derived from mythology, that can model symbolic processes. Previous papers used literary semantics, mythology, semiotics, philosophy and mathematics. The main features of the algebra are set-based elements and making association a new operation. While such a system can be reductive, it need not be. It may reconstruct into a more useful tool. Various implications for its foundations are considered.

6 Keywords:
algebra, association, mathematical modeling, numbers, reduction

1. Introduction

Mythic algebra began as a system to model mythology, then expanded into narration, thence to cover a host of mental processes using the operation of association (2003). Once the system was completed, new applications were made into semiotics and mathematics (2008). One may question just how far can a system go that is derived from mythology. A guiding assumption was that the mental processes that manifested as myths would also manifest as anything else, if only the underlying system was found.

The guiding principle was to use the features of basic algebra, looking for group principles and two distinct operations. The results became the following system represented in a formulaic lineup:

$(p,q,x,y,s,t),M,R,M/R,R/M,\rightarrow,=,\neq,\approx,\approx\neq,+,-,*,\div$

This lineup separates into levels as:

Sets (p,q,x,y,s,t) of elements people p and their actions q, things x and their actions y, space s and time t.

Functions $M,R,M/R,R/M,\rightarrow$, set states mythic M or real R that can map elements among them by / or just alter elements or states by $\rightarrow$.

Relations $=,\neq,\approx,\approx\neq$ of equality, inequality, similarity, or dissimilarity.
Operations $+,-,*,\div$ of addition, subtraction, association or dissociation.

2. Discretion

Sets have discrete elements. By discrete, we mean separate, distinct, and also countable if we cared to. The meaning of countable will be explored in a later section, while here we look at the most basic definition of elements, their separate, distinct quality. Whether elements are in the same or different sets, they remain distinct from each other. A set of (A,A,A) has three A's just as (A),(A),(A) does or the listing A,A,A does.

Concrete reality clearly has things we perceive as distinct from each other: a rock is not a tree even if we have no names for them. Nature builds itself by using discrete elements, from atoms up to cells and beyond. Alfred North Whitehead (1967) in 1925 noted this fact of reality and examples of the advance in human thought once we recognize it:

The influence of atomicity was not limited to chemistry. The living cell is to biology what the electron and the proton are to physics. Apart from cells and from aggregates of cells there are no biological phenomena. The cell theory was introduced into biology contemporaneously with, and independently of, Dalton's atomic theory. The two theories are independent exemplifications of the same idea of 'atomism.' (99-100)

Our languages have modeled or mimicked this reality of discrete elements by using discrete words, regardless of the particular syntax or semantics. Labeling with words requires otherness, difference. Before Derrida wrote anything on deconstruction, the Zen philosopher Alan Watts (1959) observed the troubles that arise when making discrete distinctions that may be arbitrary:

For the function of these nonsense terms is to draw our attention to the fact that logic and meaning, with its inherent duality, is a property of thought and language but not of the actual world. The nonverbal, concrete world contains no classes and no symbols which signify or mean anything other than themselves. Consequently, it contains no duality. For duality arises only when we classify, only when we sort our experiences into mental boxes, since a box is no box without an inside and an outside. (80)

This “inherent duality” goes at least as far back as Plato and Aristotle, whose ideas were expressed as three Laws of Thought: 1. The law of identity [A is A]. 2. The law of contradiction [either A or not- A]. 3. The law of exclusion, or excluded middle [only A or not- A] (Law of thought, 2019).

Not only languages, but thought itself may become biased into useless or useful dichotomies. As the Taoists noted millennia ago (2007), once you make a discrete thing or quality you then have to have something else that is not that thing:

For is and is-not come together,
Hard and easy are complementary;
Long and short are relative;
High and low are comparative;
Pitch and sound make harmony;
Before and after are a sequence. (2)

Cut out windows and doors
In the house as you build;
But the use of the house
Will depend on the space
In the walls that is void.

So advantage is had
From whatever is there;
But usefulness rises
from whatever is not. (11)
(Blakney 60, 70)

Some basic dichotomies exist in mythic algebra, too. There is a static-dynamic principle to divide elements: static p,x,s or dynamic q,y,t. There is also a distinction of persons-things or neither, as p,q or x,y or s,t. This has been critiqued, for what defines a person whereas a sentient creature like a pet is a thing? If this criterion is a human body, then sentient minds don't count. One has to define the elements according to need.

Then the states of sets divide into the basic dichotomy of mythic M or real R, with mythic defined as not-real. Generalizing states into F or G still means that state G is not-F. Any number of distinct states can then be notated, all defined as not each other: A,B,C,D,E,F,G,H,I,J,K,L,N,O,U,V,W,Z, etc.

What criteria make them not equivalent? It depends on the context. For mythic stories, the M-R distinction was based on an M(s,t) mythic spacetime which was not in our everyday world. For an F-G distinction it could simply be two separated sets, though seemingly equivalent elements: F(a,b,c), G(a,b,c). F is this one, G is that one.

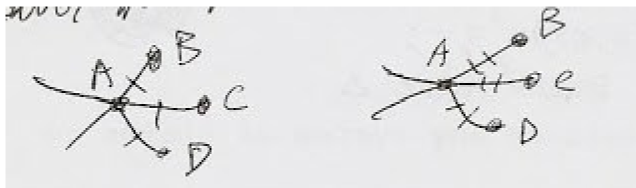
So we now have sets of six basic elements which can vary in their definitions. The state functions of these sets can also vary in definition, just as long as they differ from each other: M-R, F-G, etc. The elements and states are discrete because they differ in binary polarities. Elements p,x,s are similarly static, yet p,q are similarly of people but x,s are not. The utility of a people-things distinction fits realms in which people figure, such as the human mind or cultures. In realms of physical nature or pure mathematics, this may not matter.

These four different realms of use will be examined also in a later section. For now we can conclude that elements and states of sets are only defined by the quality of being discrete from each other. Another meaning of discrete is unconnected, which brings us to consider the next levels of mythic algebra.

3. Plus -- or Not

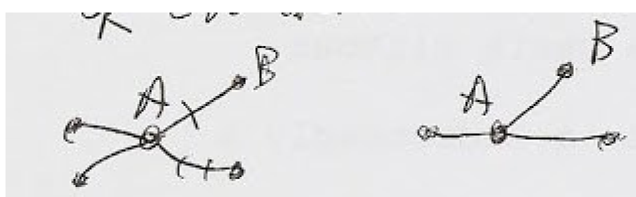
The basic operation that all mathematics is founded upon is addition. Once we have discrete units we combine them. Undoing addition is subtraction, extended addition is turned into the shortcut of multiplication, or its undoing is division. Mythic algebra does not consider multiplication-division operations, presuming they are implied by addition-subtraction. But what else may elements do besides combine by adding? They may add to stay distinct, such as: A+B = A+B, or they may add to transform, such as: A+B→C, like 1+2=3 as a new number.

These kinds of operations work well with discrete elements, but elements can also have a continuous connection apart from this, even if they maintain their discrete character. Such connections may not fit addition, but rather addition may fit into such broader connections. This continuous connection or linkage has been modeled as the ∗ operation of association. Some sketches can show the inadequacy of addition to fully convey all possible connections of discrete point-elements:



Points A,B,C,D are linked as A∗B, A∗C, A∗D and arbitrary measures of the paths may be taken as the magnitudes of points B,C,D. In the first example, A+B+C+D = 2+2+2 = 6, and in the second example 3+3+3 = 9 yet in both examples the paths are the same lengths. Any scale of distance does not really matter to A∗B, etc.

Or consider defining point A by its unequal links:

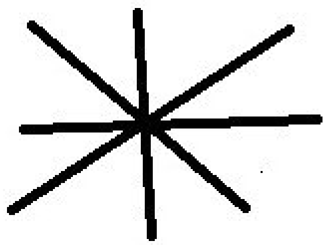


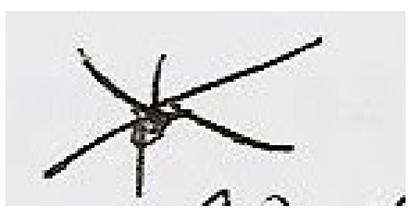
On the left, A= 1+1+2+3 =7
On the right, A= 1+1+1 =3
Yet A and B are the same path and actual distance in both cases. Even B in these examples has magnitude 2 or just 1. Traditional number lines avoid this confusion of

miscounts by keeping connections in a single dimension to measure, so any differences of scaling can be compared:

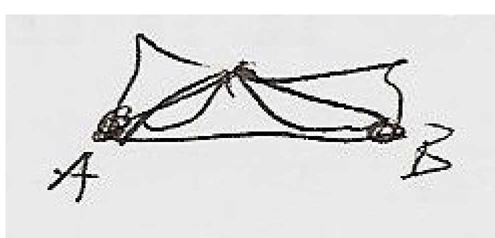
A__+__+__B is 3/3 which equals A___+____B or 2/2

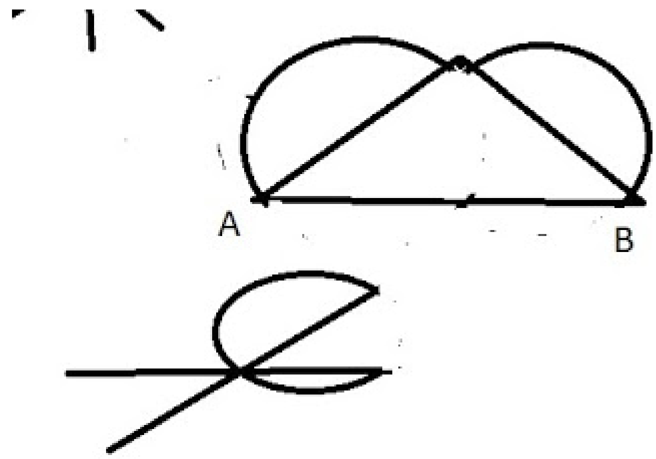
But such additive lines are single components of possibly endless continuous links:





whether on a two-dimensional page or any-dimensional space. As if out of *Flatland* (1884), a line connecting two points may only convey part of their total linkage:





A________B

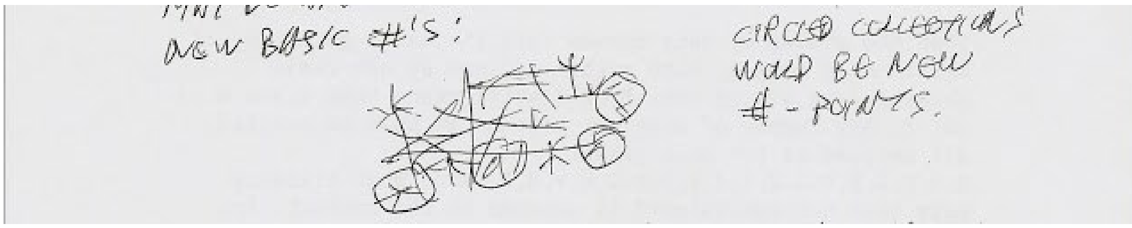
And if we only define the point's magnitude by measure along that single dimension, we miss all of the other magnitudes and path-connections notated by the asterisk symbol ∗.

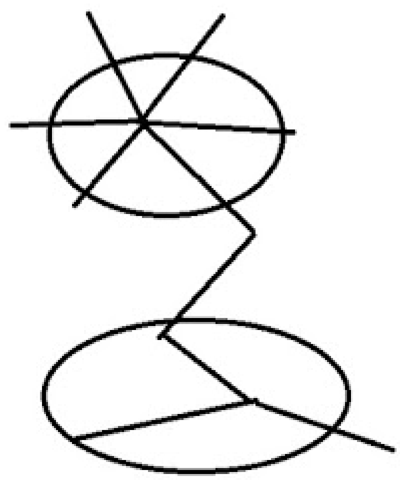
4. Levels

Besides the extra dimensions of connectivity, levels of organization may upscale or downsize in a fractal-like style of structure, maintaining mythic algebra at any level just as arithmetic does. The results of any use of mythic algebra may be subsumed into a new basic set element, its opposite elements then noted, and the usual mythic algebra operations and functions performed on these new elements.

By opposite, I mean pairs of static-dynamic elements. Even the space-time pair (s,t) can be a basic static-dynamic pair, if we define space as the field that allows differing elements to occur, and time as the force that allows change to occur, such as motion or mapping or any action.

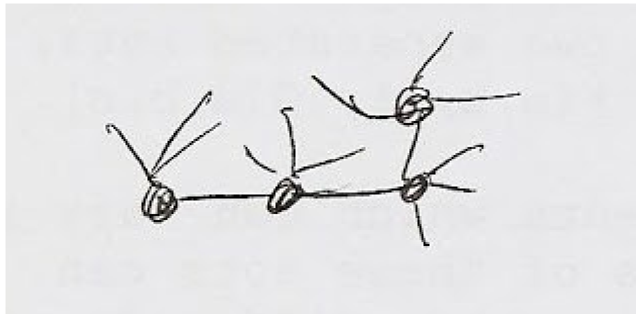
This makes a kind of reduction, but not reductive to the single operation of addition, as arithmetic does, and the edifice of mathematics built upon that. The properties of one level may not be predictable from the association links' principles at a different level, so no perfect reductionism exists. A structure can still be sketched to show how one group of associations may be arbitrarily defined as the next level's new basic elements:





Circled collections would be new element-points.

With the newer elements we may have only a sketch of:



And such a rescaling of perspective itself need not be on a uniform scale measurable by arithmetic.

However, natural science does model reality using levels of scaling of uniform numerical measure. We proceed from the units of ecology – whole organisms, to units of biology – body parts, to units of chemistry, to underlying physics, to theoretical mathematical models of the basis of physics. Each level uses numerical addition to construct the next level, but even here we get new properties unexpected and not predictable from earlier levels.

Still, these new properties can usually be modeled with the same arithmetic-based mathematics that also is used for reduction between levels. The addition operation, using discrete numbers, does well to model nature. It is simply a starting fact without prior justification, such as is remarked upon mathematics by Wigner (1960).

If additive numbers are just one aspect of a larger mythic algebra using $*$ connections, then anything modeled by mathematics may have other real links missed by the traditional mathematics. It remains to prove such links and avoid the pitfalls of false analogies and wishful, magical thinking. And perhaps nature is so only because it is limited to arithmetical number-mathematics. But any emergent properties in nature may indicate the missing $*$ links of the association operation.

5. New Math

I have always viewed askance any system of claims to knowledge that can't be turned into a visual diagram or also into a structural symbolic system such as mathematics or logic, even though I consider all such systems merely provisional, pragmatic knowledge. Nonetheless, any long tome I consider as talking a subject to death without getting to any deep understanding. This is undoubtedly a bias of my own brain, and an urge to simplify and unify. Since words to me are mere labels, I look for symbols that convey real force, more reality than labels. Our scientific civilization has a few such systems, mainly of mathematics, and perhaps this has been its appeal to me, a feeling that it is truer than mere word labels. Yet such truths seem so limited, that one can believe that a better, truer mathematics is possible. Perhaps this has been an urge upon me, too.

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