A Universe Invariant Numeral System

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Parallel universes are a reality. Not only are they a reality, but they are also in math. We choose to show you this via a proof. This proof will show you that there are many different numeral systems other then the ones we use. The proof will use communitative Algebra to show you these many different numeral systems. The first two proofs are based from the book "A Survey Of Modern Algebra" by Garrett Birkoff and Saunders Mac Lane [1].

Here are the three basic laws of equality for any commutative ring **R**.

Reflexive law: a = a.
Symmetric law: If a = b, then b = a.
Transitive law: If a = b and b = c, then a = c, valid for all a, b, and c.

For all a in **R**, 1 * a = a.

Proof. For all a in **R**:
1) 1 * a = a * 1
2) a * 1 = a
3) 1 * a = a. ■

If u in **R** has the property that a * u = a for all a in **R**, then u = 1.

Proof. Since a * u = a holds for all a, it holds if a is 1.
1) 1 * u = 1
2) 1 = 1 * u
3) u = u * 1
4) u = 1. ■

With the above proofs we can now create a less simplified form of the three basic laws of equality for any commutative ring **R** for any single value of u.

Reflexive law: a * u = a * u.
Symmetric law: If a * u = b * u, then b * u = a * u.
Transitive law: If a * u = b * u and b * u = c * u, then a * u = c * u, valid for all a, b, and c.

We now propose the Meta-commutative ring $\mathbf{R_u}$, where when u = 1 then it denotes the normal commutative ring **R** of this universe. For meta-commutative ring $\mathbf{R_u}$, u ≠ 0.

Here are the three basic laws of equality of the meta-commutative ring $\mathbf{R_u}$.

Reflexive law: a * u = a * u.
Symmetric law: If a * u = b * u, then b * u = a * u.
Transitive law: If a * u = b * u and b * u = c * u, then a * u = c * u, valid for all a, b, and c.

Each separate $\mathbf{R_u}$ defines a separate commutative ring.

Proof. If $\mathbf{R_1}$ exists then $\mathbf{R_m}$ exists along with $\mathbf{R_n}$. $n \neq m \neq 1$.
1) For all $\mathbf{R_u}$, then $a * u = a * u$.
2) If $\mathbf{R_n}$ is not separate from $\mathbf{R_m}$ then $(a * n = a * n) = (a * m = a * m)$.
3) But they are not equal therefore $\mathbf{R_n}$ is a separate Commutative Ring from $\mathbf{R_m}$. ■

From the above proofs we can see that $\mathbf{R_u} \neq \mathbf{R}$. But the above proofs only show that there could be other numeral systems, not that there are. We will now show you that these new numeral systems also allow different values of π. In math π is defined many different ways. We are referring to the value of the difference between a circles diameter and that same circles circumference on a "flat" surface. Of the many different ways π can be defined, these many different ways boil down to two separate routes; arithmetically or physically. For a physical discussion on changing the value of π in a parallel universe, I refer you to the authors 1997 paper, entitled "Foundations Of Parallel Universe Math" [2]. Here is an arithmetic equation for the value of π [3],

$$\pi/4 = 1/1 - 1/3 + 1/5 - 1/7 + 1/9 - ...$$

To have the same arithmetic equation calculate a different value of π, multiply both sides of the equation by u, where u is from $\mathbf{R_u}$ and you get this equation,

$$(\pi * u)/4 = u/1 - u/3 + u/5 - u/7 + u/9 - ...$$

$\pi * u$ is your new value of π. You can do this same procedure to all arithmetic equations of π. But this would seem to imply that all we have done is derived non-euclidean values of π. This is not the case, because we can also get different values of e. Here is an arithmetic equation to calculate the value of e [4],

$$e = 1/0! + 1/1! + 1/2! + 1/3! + 1/4! + ...$$

To have the same arithmetic equation calculate a different value of e, multiply both sides of the equation by u, where u is from $\mathbf{R_u}$ and you get this equation,

$$(e * u) = u/0! + u/1! + u/2! + u/3! + u/4! + ...$$

$e * u$ is your new value of e. You can do this same procedure to all arithmetic equations of e, and we also say that all arithmetic equations of any mathematical constant can also be changed in like manner to arrive at other universes values of those mathematical constants; this includes i, φ and others. No where in non-euclidean geometry does it mention that different values of e or other mathematical constants can be found.

The above paragraph splits math into two different groups. These two groups are universe specific (US) math and universe invariant (UI) math. We will define universe specific as; events, ideas, memes, rules, and laws that are specific to exactly one universe. We will define universe invariant as; events, ideas, memes, rules, and laws that are the same in all parallel universes. The definitions for US and UI are not limited to math concepts alone, but this paper will only be concerned with math concepts. The above paragraph shows us that the mathematical constants are US, but the equations calculating them are UI. The number line **R** and the value of 1 are also US, as shown in the above proof. The proof itself is UI. The value of 0 is UI. Here is a general rule for determining whether a math statement is UI or US. A UI statement will not change its meaning when a known US statement is applied to it A US statement will change its meaning. This mixture of US and UI, in math, is limiting our understanding of math, because math is not complete without application to all parallel universes. What we need, to begin a parallel universe understanding of math, is a UI numeral system; because, as was shown above, our current numeral system is US. To that end is the reason for this paper. The author believes he has found a UI numeral system that is currently not being taught or investigated.

Here is that UI numeral system. The numeral system is binary, but it doesn't use 1 and 0, but instead uses u and 0, where u is the same as defined above. All the rules of binary math apply to this numeral system, unless it is revealed that any one or more of these rules are US. If a rule is found to be US that rule can not be applied to get a UI result. Depending on where that US rule is, and it's importance with respect to the other binary rules of math, it may or may not invalidate other binary rules of math, to maintain a UI numeral system. Here are the numbers 1 – 10 as represented in our UI numeral system when u = 1,

1 = u
2 = u0
3 = uu
4 = u00
5 = u0u
6 = uu0
7 = uuu
8 = u000
9 = u00u
10 = u0u0.

The above numeral system assumes that the place value concept is UI. As our computers currently operate, they already operate on a binary numeral system, what's it to say, we take the results of our computer and say that it is a UI result? Until we understand more completely our US and UI mixture in math, all we can say is that somewhere in the computer calculation a US aspect has been entered into the calculation and that makes the whole calculation US. It is the authors belief that the actual value of u in the UI numeral system is all possible values of u, when performing an equation. When you assign “one” value to u you then make the result US, and that “one” value will always be relative to this universe.

It is the authors belief that u is a new number unlike any we have encountered before.

So, we go onto the question of "Is reality digital or analog?" We believe the above paper shows the digital aspects of this universe and the parallel universes, but the above paper also shows that the digital in this universe isn't the same as the digital in any of the parallel universes.

References

1. Birkhoff, Garrett, and MacLane, Saunders. "A Survey Of Modern Algebra". (1997). A. K. Peters, Wellesley, Massachusetts.
2. Akerlund, Jim. "Foundations Of Parallel Universe Math". (August, 1997). Newsgroup: Alt.sci.physics.new-theories. http://groups.google.com/group/alt.sci.physics.new-theories/msg/2bcd2fade2f7cf50
3. Blatner, David., "The Joy Of π". (1997). Walker Publishing.
4. Wikipedia. "*e* (mathematical constant)". (December, 2009). http://en.wikipedia.org/wiki/E_(mathematical_constant) .