Understanding the Doctrine of the Trinity through Mathematics

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"Mathematics is the language in which God has written the universe."
-Galileo Galilei

ABSTRACT

The doctrine of Trinity is the foundation of most Christian faiths. In this paper, we will use general knowledge of mathematical sets to help us understand parts of the doctrine of the Trinity. We are not, by any means, defining God as a mathematical system, nor are we trying to reduce God to an idea and eliminate the *mystery*. The mathematical language, however, allow us to easily understand and accept certain statements in the doctrine of our Triune God.

1. INTRODUCTION

The doctrine of the Trinity talks about One God and Three Persons (the Father, the Son and the Holy Spirit) who are each distinct but truly and fully God. In our Nicene Creed, we see that the Son is eternally begotten, not made, from the Father. The Holy Spirit proceeds from the Father and the Son. The Nicene creed is one that the Christians recite often at church services and that the doctrine of the Trinity guides their Christian life. However, very few tried to understand the doctrine and simply considered it as a mystery of their faith. Our doctrine on the Trinity was revealed to us both by Scriptures and by our long history of human experiences. Many argued about the wordings on how we state the doctrine for centuries. At the end, we are content that, perhaps, none of our human languages can describe God properly.

Christians believe that God loves all He created and that He tries to reveal himself to us through the Scriptures and through nature, including ourselves. It will be impossible to know if Mathematics is the language of God, as Galileo pointed out. However, it has been known by some that Mathematics, a language developed by our human intelligence, seems to perfectly describe some laws of nature, and that the laws of nature seem to provide no contradictions to our Mathematics. Some looked at the spiral conch shells and noticed that natural spirals fit certain human-created formulas. [i] A few talked about the influence of theology on mathematics.[ii] [iii]Some rewrote John 1:1[iv] into an equation for the "golden proportion".[v] Are these coincidences, or did God created us so that our natural thoughts allow us to "know" him through certain "languages" that we eventually developed? We will leave this debate to the philosophers.

In this paper, we will take a look at a few particular points in the doctrine of the Trinity which gave rise to many debates in our church history. The points to consider are:

1. The Father, the Son, and the Holy Spirit are not the same.
2. The Father, the Son, and the Holy Spirit are each God.
3. The Son is eternally begotten, not made, from the Father.

For each of the above points, we will explain it in simple Mathematical language to uncover the possibility of these truths. Section 2 introduces two sets which we will call "The Father" and "The Son". From there, we see the Son is clearly distinct from the Father and that the Son is not created by any additional formulation. The Son clearly exists the moment the Father exists.
In section 3, we will look at three different sets, the Father, the Son and the Holy Spirit, and see that they are in fact "equivalent", that is, they are each God. Section 4 concludes our discussion.

2. INFINITE SETS

A mathematical *set* is a collection of distinct objects. For example, set A = {1, 3, 5, 7, 9, 11, 13, 15} means the set A consists of the odd numbers 1, 3, 5, 7, 9, 11, 13 and 15. A *subset* is a smaller set of objects that are members of a bigger set. For instance, we say B = {1, 5, 15} is a subset of A, $B \subset A$. In these examples, both sets A and B are finite sets, as they have finite number of elements in each set.

The *cardinality* |A| of a set A is the number of elements in the set A. In our example, |A|= 8 as there are eight elements in A. We say a set S is *infinite* if the cardinality of the set S is infinite. For instance, the set of all integers is infinite. The set of all prime numbers is also infinite.

Let "The Father" F= { …, -2, -1, 0 , 1, 2, 3, 4, …}. That is, we are naming the set of all integers as "The Father."

Let "The Son" S = { …, -4, -2, 0, 2, 4, …}. That is, we are calling the set of all even integers as "The Son."

Here, we have two infinite sets, F and S. Clearly, S is distinct from F. In fact, $S \subset F$ one gets that "The Son" came from "The Father", or one might say that "The Son" is begotten from "The Father". Furthermore, the moment when F exists, S also exists. After all, the even integers are there in the set of the integers! So, here we are looking at "The Son" that is born of "The Father" before all ages, and not made!

3. SETS AND THEIR ONE-TO-ONE CORRESPONDENCE

We say that there is a *one-to-one correspondence* between two sets if there exists a mapping between the elements of the two sets so that a member of the first set maps to exactly one member of the second set and each member of the second set maps to exactly one member of the first set.

For instance, where A={ 1, 3, 5, 7, 9, 11, 13, 15} and B={ a, b, c, d, e, f, g, h}, if we set up mappings between A and B as follows,

1	3	5	7	9	11	13	15

a	b	c	d	e	f	g	h

Then, we say there is a one-to-one correspondence between the sets A & B. Note that both A and B are sets with the same cardinality 8. Indeed, sets with the same cardinality that can be put into a one-to-one correspondence are *equivalent sets*.

For our sets "The Father" and "The Son" which are both infinite sets, we set up a mapping as follows:
For each element x in F, we map it to 2x in S. For example, the integer 3 in F maps to the integer 6 in S. For each element y in S, we map it to ½ y in F. So, the integer 10 in S is mapped to 5 in F.
It is interesting to note that as both sets "The Father" F and "The Son" S are infinite, we can always find a member in F that is mapped to another member in S and vice versa.

In essence, the establishment of this one-to-one correspondence between the two sets tells us that F and S are equivalent. In other words, if "The Father" is God, then so is "The Son". i.e. "The Son" is truly and fully God as "The Father" is truly and fully God.

Now, let us rewrite the elements of the Son as follows:

-4	-2	0	2	4	6	…
-2'	-1'	0'	1'	2'	3'	…

So, "The Son" S = { …, -2', -1', 0', 1', 2', 3', …}

Now, let's take a look at a new set where the members are formed by pairings of elements in "The Father" and "The Son". We will write the members of this new set as (x, y) where x is a member of "The Father" and y is a member of "The Son".

So, this new set looks like { …, (0,0'), (0, 1'),…, (2, 3'),…, (4, 2'),….}

Note that we can also rewrite an element (x, y') as $\frac{x}{y'}$ as long as $y \neq 0$.

If we consider all fractions obtained this way as distinct (even though they might have the same mathematical values, they are represented differently), we basically have the set that resembles the set of rational numbers.

Let the set of rational numbers be "The Holy Spirit" HS.

See how "The Holy Spirit" proceeds from "The Father" and "The Son"?! In fact, in this representation, we have both $F \subset HS$ and $S \subset HS$, as integers can certainly be rewritten as a rational numbers. At first glance, it seems that implies the "Holy Spirit" is "bigger" than "The Father" and "The Son". However, one needs to be reminded "love" is the greatest of all. Certainly, the love between the Father and the Son is great. On the other hand, this "love", this "Holy Spirit" will not exist without either the "The Father" or "The Son". Besides, we clearly have the "Spirit of the Father" in Matt 10:20 and Gal 4:6 says "God has sent the Spirit of his Son into our hearts"!

Now, how do we see HS as an equivalent set to F or S? That is, how can we claim that "The Holy Spirit" is truly and fully God?

First, note that integers can be put into 1-to-1 correspondence with natural numbers, i.e. all the positive integers bigger than 0.

Integers	0	-1	1	-2	2	-3	3	…
Natural #s	1	2	3	4	5	6	7	…

If we can establish a one-to-one correspondence between the rational numbers and natural numbers, then we are actually saying that HS is equivalent to F and, therefore, S. Although it looks like between any given two rational numbers, we can always have another rational number and it seems impossible to have any meaningful correspondence between natural numbers and rational numbers, the 19th century mathematician Georg Cantor actually found a way to order the rational numbers so that the rationals can be put into a one-to-one correspondence with the natural numbers.[vi]

Thus, if "The Father" is God, so are "The Son" and "The Holy Spirit". "The Holy Spirit" who proceeds from the Father and the Son, is adored and glorified.

4. LAST WORDS

The thoughts above show how our human-created Mathematical language has the capacity to embrace the concept of the existence of distinct matters that are equivalent. There is absolutely no grammatical confusion of our triune God, the Three Persons in One God, in Mathematics. We are not implying that God is a mathematical set. We are simply allowing our minds to accept and understand the doctrine of the Trinity through our acceptance and understanding in the logic intrinsic in Mathematics. Perhaps, this paper serves as a reminder that our creative minds belong to God and God loves to reveal to us who He is, so that we may know Him and praise Him. It is also interesting that God reveals himself to us in personal ways, if we only have the eyes to see. Mathies should have no trouble believing that

The Father, the Son, and the Holy Spirit are all distinct. The Father, the Son, and the Holy Spirit are all truly and fully God. Jesus Christ, begotten Son of God, exists as the Father exists.

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[i] Robert Lawlor, Sacred Geometry, (Thames and Hudson Ltd, London, 1982), P. 56.

[ii] Ladislav Kvasz, "The Invisible Link Between Mathematics and Theology". www.asa3.org/ASA/PSCF/2004/PSCF6-04Kvasz.pdf
[iii] Katherine Loop, "God and Math?", www.christianperspective.net/math/god-and-math/

[iv] John 1:1 " In the beginning was the Word, and the Word was God, and the Word was God."
[v] Robert Lawlor, Sacred Geometry, (Thames and Hudson Ltd, London, 1982), P. 46-47

[vi] http://mathforum.org/isaac/problems/cantor2.html