Name(s)	Project Number
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Project Title

The Banach-Tarski Paradox and Equidecomposability and Their Applicability to the Infinite

Abstract

Objectives/Goals
The objective of this project was to formulate two mathematical proofs(one through a graphical demonstration in the context of the mechanisms of the Hyperwebster, an infinite dictionary, and one through compiling) to affirm the validity of the Banach-Tarski Paradox.

Methods/Materials
Personal computer, Painting Software(Paint), and the Pyth Compiler/Executor.

Results
I was able to prove that the Banach-Tarski Paradox was valid by converting the mechanisms of the Hyperwebster, an infinitely countable dictionary, to a three-dimensional graphical sense for a solid sphere and by utilizing the Pyth Compiler/Executor to compile a rotating sphere to imitate the workings of the Banach-Tarski Paradox.

Conclusions/Discussion
I was able to confirm my hypothesis of the legitimacy of the Banach-Tarski Paradox in a pure mathematical sense. I have realized that currently it is only able to be proven in the abstract mathematical world because in this context, this paradox is not constrained by the limitations of the physical boundaries that are present in the real world. However, it is quite true that what is able to be proven mathematically is often proved through physics as well, and it may be possible for an application in the physical world to be created if our technology ever reaches that level.

Summary Statement

I devised two mathematical proofs through a graphical context and through a compiler to test the validity of the Banach-Tarski Paradox, which states that one 3-D ball, in set-theoretic geometry, can be cut out to yield two identical copies.

Help Received

I did not receive any assistance and worked alone on my experiments.