The axiomatic definition of infinitesimals

Ihsan Raja Muda Nasution

November 6, 2014

Abstract

In this paper, we redefine the infinitesimals by using axiomatic method.

1 Introduction and results

There are several definitions of the infinitesimals:

- 1. Archimedes' definition in the method of exhaustion.
- 2. Leibniz's definition in differential calculus.
- 3. Cauchy's definition in the theory of limit.
- 4. Robinson's definition in non-standard analysis.

We try to propose the redefinition of infinitesimals in the following axiom:

Axiom 1. Let e be the infinitesimal. Then:

- 1. $0 \le e \le 1$.
- 2. $e \approx 1/n!$.
- 3. $e > 1/\infty$.

We hope the definition can help us to understand the behavior of infinitesimals.