

On the infinitesimals

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Abstract

Our result is the explicit form of the infinitesimals.

1 Introduction

Tropp [Tro02] believed that non-standard analysis provides the most satisfying view of infinitesimals. Parker [Par] stated that analysis can be based on both a constructivist and intuitive view of the infinitesimal. In this paper, we provide the construction of the minimum near zero.

2 Construction of the small number

For any non-negative integer n , it holds

$$10^n = 1 \underbrace{0 \dots 0}_n$$

and

$$10^{-n} = 0. \underbrace{0 \dots 0}_{n-1} 1.$$

For the infinity W , we define

$$10^W =: 100 \dots$$

By deleting the zero, we obtain

$$000 \dots \rightarrow 00 \dots \rightarrow 000 \dots \rightarrow \dots 000.$$

For the infinity W ,

$$10^{-W} = 0. | \dots 001.$$

We use the notation $|$ to separate between the decimal point $.$ and ad infinitum notation \dots . We denote the number $0. | \dots 001$ by Ψ .

References

- [Par] F. Parker. Infinitesimals: Intuition and rigor. Preprint.
- [Tro02] J. A. Tropp. *Infinitesimals: History and Application*. PhD thesis, University of Texas, 2002.