

# On the size of continuum

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## Abstract

In this paper, we propose the alternative estimation of the cardinality of continuum.

MSC: 03E17, 03E50

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## 1 Introduction

Cohen [Coh63, Coh64] showed that the continuum hypothesis (CH) is independent of Zermelo-Fraenkel axioms with the axiom of choice (ZFC). Our motivation is to find the hypothetical size of continuum.

## 2 Results

We consider the inequality

$$\sqrt{2} < 2. \tag{1}$$

In (1), the inequality is powered by  $\aleph_0$ , then

$$\sqrt{2}^{\aleph_0} < 2^{\aleph_0}. \tag{2}$$

The value of  $2^{\aleph_0}$  seems too large for  $\aleph_1$ . And  $\sqrt{2}^{\aleph_0}$  maybe equals  $\aleph_1$ . Then we assume that  $\neg\text{CH}$  is true. Thus, we claim that

$$\sqrt{2}^{\aleph_0} = \aleph_1. \tag{3}$$

And

$$\aleph_2 \leq 2^{\aleph_0}. \tag{4}$$

## References

- [Coh63] P. J. Cohen. The independence of the continuum hypothesis. *Proc. Nat. Acad. Sci. U. S. A.*, 50:1143–1148, 1963.
- [Coh64] P. J. Cohen. The independence of the continuum hypothesis, II. *Proc. Nat. Acad. Sci. U. S. A.*, 51:105–110, 1964.