SOME CONJECTURES ON INEQUALITIES IN OPERATOR AXIOMS

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Abstract. The Operator axioms have deduced number systems. In this paper, we conjecture some inequalities in Operator axioms. The general inequalities show the value of Operator axioms.

1. Introduction

In [3], we define the Operator axioms to extend the classical real number system. The classical real number system only includes special irrational numbers. However, Operator axioms import the general irrational numbers to construct a complete real number system. In this paper, we apply Operator axioms to generalize various inequalities. The general Bernoulli's Inequality show the value of Operator axioms.

In [4, TABLE 2], we have defined some replacements for the notations of the Operator axioms. In this paper, we will apply these concise replacements. For convenience, we define two symbols '$>$' and '$\geq$'. Then we add two axioms as follows into Operator axioms:

$$\begin{array}{ll} & \Psi\{ \\ (OA.116) & (\bar{a} > \bar{b}) \Leftrightarrow (\bar{b} < \bar{a}), \\ (OA.117) & (\bar{a} \geq \bar{b}) \Leftrightarrow (\bar{b} \leq \bar{a}) \\ & \}. \end{array}$$

The paper is organized as follows. In Section 2, we conjecture some commutative inequalities in Operator axioms. In Section 3, we conjecture some distributive inequalities in Operator axioms. In Section 4, we conjecture a general Bernoulli's inequality in Operator axioms.

2. Some Commutative Inequalities In Operator Axioms

In this section, we suppose that $a \in [1, +\infty)$, $b \in [1, +\infty)$, $c \in [1, +\infty)$ are real numbers.

Conjecture 2.1. *If $n \in N$, then $[[a +'_n a] + [b +'_n b]] \geq [[a +'_n b] + [b +'_n a]]$ holds.*

Conjecture 2.2. *If $n \in N$, then $[[a +'_n a] + +[b +'_n b]] \geq [[a +'_n b] + +[b +'_n a]]$ holds.*

Conjecture 2.3. *If $n \in N$, then $[[a -'_n a] + [b -'_n b]] \leq [[a -'_n b] + [b -'_n a]]$ holds.*

Conjecture 2.4. *If $n \in N$, then $[[a -'_{[n+1]} a] + +[b -'_{[n+1]} b]] \leq [[a -'_{[n+1]} b] + +[b -'_{[n+1]} a]]$ holds.*

Conjecture 2.5. *If $n \in N$, then $[[a/'_n a] + [b/'_n b]] \leq [[a/'_n b] + [b/'_n a]]$ holds.*

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3. Some Distributive Inequalities In Operator Axioms

Conjecture 3.1. *If* $n \in N$*, then* $[[a +'_{[n+2]} [b + c]]] \geq [[a +'_{[n+2]} b] +'_{[n+1]} [a +'_{[n+2]} c]]$ *holds.*

Conjecture 3.2. *If* $n \in N$ *and* $b \leq c$*, then* $[[a +'_{[n+1]} [b + +c]]] \geq [[a +'_{[n+1]} b] +'_{[n+1]} c]$ *holds.*

Conjecture 3.3. *If* $n \in N$*, then* $[[a -'_{[n+2]} [b + c]]] \leq [[a -'_{[n+2]} b] +'_{[n+1]} [a -'_{[n+2]} c]]$ *holds.*

Conjecture 3.4. *If* $n \in N$*, then* $[[a + b] +'_{[n+1]} c] \geq [[a +'_{[n+1]} c] + [b +'_{[n+1]} c]]$ *holds.*

Conjecture 3.5. *If* $n \in N$*, then* $[[a + +b] +'_{[n+2]} c] \geq [[a +'_{[n+2]} c] + +[b +'_{[n+2]} c]]$ *holds.*

Conjecture 3.6. *If* $n \in N$*, then* $[[a + b] -'_{[n+1]} c] \leq [[a -'_{[n+1]} c] + [b -'_{[n+1]} c]]$ *holds.*

Conjecture 3.7. *If* $n \in N$*, then* $[[a + +b] -'_{[n+1]} c] \leq [[a -'_{[n+1]} c] + +[b -'_{[n+1]} c]]$ *holds.*

Conjecture 3.8. *If* $n \in N$*, then* $[[a + b]/'_{[n+1]}c] \geq [[a/'_{[n+1]}c] + [b/'_{[n+1]}c]]$ *holds.*

4. General Bernoulli's Inequality In Operator Axioms

Conjecture 4.1. *If* $n \in N$ *and* $d \in [2, +\infty)$*, then* $[[1 + a] +'_{[n+1]} d] \geq [1 + [a +'_n d]]$ *holds.*

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