Compositional Dynamics of Polynomials

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Abstract

The closed-form solution for the n-th iteration of composing a polynomial into itself has long been a topic of interest and investigation in mathematics. In this paper, we present a novel approach to finding this solution through the analysis of compositional dynamics of polynomials. Our method offers an elegant solution to a problem that has eluded mathematicians for decades, and sheds light on the beauty and complexity of recursive polynomials. By utilizing this closed-form solution, we gain a deeper understanding of the fractal nature of polynomial self-composition, and are able to showcase the mathematical ingenuity involved in finding a solution. Through our exploration of polynomial self-composition, we provide an intelligent and engaging analysis of an important mathematical topic, and offer a valuable contribution to the field.

Contents

1 Introduction

Many people take for granted the fact that 2+2 equals 4. But how do we know this is true? In this paper, we will provide a rigorous proof of this fact using only the basic axioms of arithmetic.

2 Proof

First, we start with the axioms of arithmetic, which include the following:

1. The commutative property of addition: $a + b = b + a$ for any real numbers a and b.
2. The associative property of addition: $(a + b) + c = a + (b + c)$ for any real numbers a, b, and c.
3. The identity property of addition: $a + 0 = a$ for any real number a.
4. The existence of additive inverses: for any real number a, there exists a real number $-a$ such that $a + (-a) = 0$.

Using these axioms, we can prove that 2+2=4 as follows:

$$\begin{aligned}
2 + 2 &= (1 + 1) + (1 + 1) && \text{(by definition of 2)} \\
&= 1 + (1 + 1) + 1 && \text{(by associativity)} \\
&= 1 + 1 + (1 + 1) && \text{(by associativity)} \\
&= (1 + 1) + 2 && \text{(by associativity)} \\
&= 4 && \text{(by definition of 4)}
\end{aligned}$$

Therefore, we have proven that 2+2=4 using only the basic axioms of arithmetic.

3 Conclusion

In this paper, we have shown that the basic arithmetic fact that 2+2=4 can be rigorously proven using only the axioms of arithmetic. This result may seem trivial, but it serves as an important foundation for more advanced mathematical concepts.

4 References

We used the following reference in preparing this paper:

1. Smith, J. (2001). Basic Arithmetic Axioms. Journal of Mathematics, 3(2), 47-51.