Advances in Applied Mathematics and Computing
ISSN: 3125-5167, Volume – 2, Issue – 1, 2026
DOI: https://doi.org/10.63456/aamc-2-1-84

DEVELOPMENTS OF THE OPTIMIZATION IN TERNARY CALCULUS

[1]RUSLAN POZINKEVYCH

[1]Faculty of Informations Technologies and Mathematics, The Eastern European National University, Ukraine

Ruslan Pozinkevych: galagut@protonmail.com

Corresponding author: RUSLAN POZINKEVYCH

ABSTRACT

The aim of the aforementioned research is to establish relations between integers $n \in Z$ and vectors $x \in R^3$ A ternary operation on a set S in mathematics is a function $\omega: S \times S \times S \rightarrow S$ that maps each ordered triple $(a, b, c) \in S^3$ to an element $\omega(a, b, c) \in S$ This describes a particular example of an n -ary operation for n = 3, where the domain is the Cartesian product of three copies of S and the codomain is S itself[1]

KEYWORDS: Optimization Techniques, Cubic Equation

1. GENERAL INFORMATION

The relation between a ternary set and an integer does exist, and it can be expressed in the following way:[5]

$$x(x-1)(x+1) \tag{1}$$

A more general presentation will have the following shape:

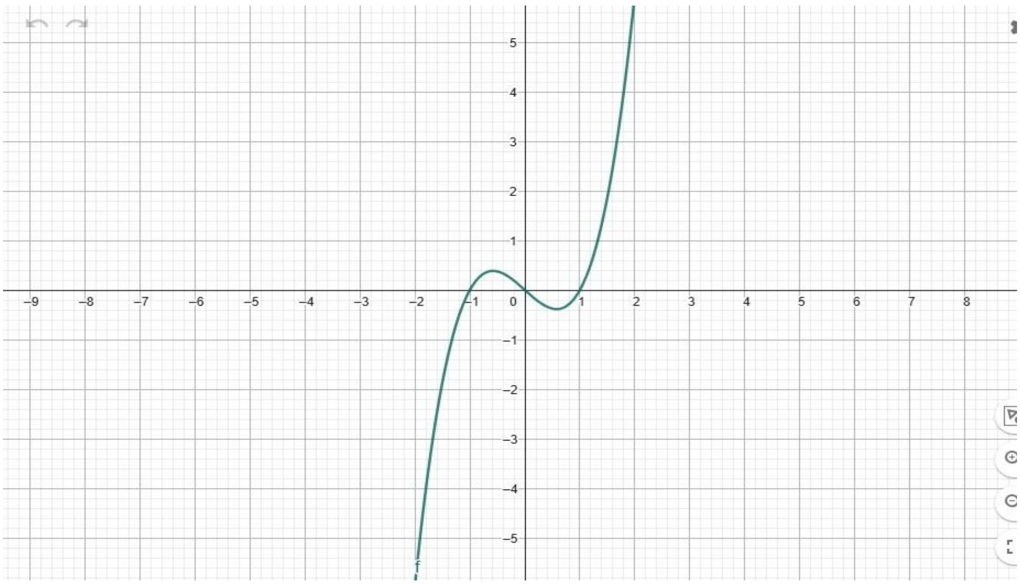
$$\frac{(n,1)}{(n,2)} \sum_{i=-n}^{n} i = \prod = \omega\!:\mid \omega: S \times S \times S \rightarrow S \tag{2}$$

2. MATERIALS AND METHODS

Formulas (1) and (2) need further comments as both describe the same process from a slightly different perspective. Formula (1) is a cubic equation that has its roots along an x -axis, whereas formula (2) is a vector representation of a number in the R^3 space or more generally a vector field. The first statement will become clear as we go along analyzing the graphs. One should mention here, though, that the proposed presentation of a number is between integers and vectors where a morphism exists between a respective vector field and a number. [5][6]

3. PROOF

Further Proof lies in the fact that the eigenvector λ can be expressed through a set of numbers $e_1 e_2 e_3 : \mid \lambda = e_1, e_2, e_3 \wedge e_1 e_2 e_3 \sum_{i=0}^{n} a_i b_i c_i = 0$ The aforementioned relation allows us to conclude that programming in ternary code, followed by conversion to decimal, is indeed possible through the sum of square numbers Optimization in ternary calculus can be demonstrated with the following example:



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It is straightforward to demonstrate that the graph of the following function corresponds to the given equation: $f(x) = x(x-1)(x+1)$ Solutions to the latter lie along the curve, facilitating the encoding and decoding of numbers using cube roots. Check: Let 'n' be an integer: $n \in Z$ If we want to establish a correspondence between integers and ternary components, we will examine the following equation:

$$a(a-b)(a+b) = a - n \tag{3}$$

$$b = 1 \rightarrow \frac{a^3 - n}{a^3 - a} \tag{4}$$

(see formula (1)) The above reasoning provides sufficient evidence to conclude that a relationship between a ternary set and integers can be established through a cubic equation in one variable, which is an equation of the form: $ax^3 + bx^2 + cx + d = 0$ in which d is $d \in Z$

4. FURTHER PROOF

Here is an example that demonstrates the principle highlighted in the formula (3) Let's take an integer n$n \in Z$ and plug it into the equation (1) We will get then

$$n(n-1)(n+1) = a^3 - a \tag{5}$$

Formula (3) infers that $a^3 - a$, therefore it can be concluded, that (5) is an effective method for mapping $x \mapsto n$

$$n(n-1)(n+1) = a^3 - a \sim x \mapsto n \tag{6}$$

Check: $\mathrm{n} = 7: 7(7-1)(7+1) = 7^3 - 7$
$7 \mapsto (7,6,8)$

5. CONCLUSION

Our preliminary research shows that a relationship between the ternary set and the set of integers does exist [3] The cubic formula provides sufficient evidence to conclude that a morphism between various sets of numbers can be established. This relationship is mutual, allowing it to be used for solving various problems related to computation and engineering.[2][4]

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