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Kakutani Conjecture

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Abstract

The Kakutani Conjecture is about performing iterative operations on a number: dividing it by 2 if it is an even number, and multiplying it by 3 and adding 1 if it is an odd number. Will it eventually reach 1? Through the equal quantity transformation 10 = O, taking the logarithm lg, then 1 = does not exist. In this proof, a number is written in binary form and then folded in half. By analyzing the structure of the number in the form of 0 and 1 combined with the Zhouyi Bagua (Eight Diagrams), it is concluded that the Kakutani rule is a Mobius strip.

Keywords: Kakutani Conjecture, Kakutani Rule, Life Formula, Equal Quantity Transformation, Zhouyi, Bagua, Qian, Mobius Strip.

Starting from the operation rules of the Kakutani Conjecture, assume that there are numbers S + 1 and S - 1 that follow the same Kakutani operation rule (S is an integer).

Then A = 3(S + 1) + 1, T = 3(S - 1) + 1
A + T = 6S + 2

Starting from the Kakutani operation rule, since A + T is an even number, it should be divided by 2.

Denote the Kakutani operation rule as L(S) = (A + T)/2 = 3S + 1

When solving for -5, -7, -17, for 3X + 1 (the Kakutani operation rule), when the calculation is repeatedly executed, it will enter a cycle. Starting from the operation rules for negative numbers, modify the Kakutani operation rule: for negative odd numbers, repeatedly execute 3X - 1, and for even numbers, divide by 2.

G = 3(S" + 1) - 1
C = 3(S" - 1) - 1
G + C = 6S" - 2

Denote the rule as F(S") = (G + C)/2 = 3S" - 1.
Then A + G + T + C = 2*[L(S) + F(S")]
Express an integer Y as Y = log(N * 1/N * X)
Then -Y = -log(N * 1/N * X)
A + T = 6Y + 2
G + C = 6(-Y) - 2

L(S) + F(S") = 3logN + 3log(X/N) + 1 + 3logN + 3log[1/(NX)] - 1
= 6logN + 3log(1/N * 1/N)
= 6logN - 6logN = 000000
That is, A + T + G + C = L(S) + F(S")

That is, Theorem 1: The property remains unchanged after folding in half.

Write the number S in binary form and then fold it in half. There are four forms corresponding to the starting numbers 0, 1, 10, and 11. Write the Bagua (Eight Diagrams) from the up-down structure form to the left-right structure form (), and the corresponding relationship between the 64 hexagrams and the AGCT genetic code can be obtained.

From AAA = AOAO
Then x^ {3} =2x^{2} (1)
3x = 2x + 2 (2)

From the Life Formula (Equal Quantity Transformation)
A = T, G = C
Then A + G=T + C
That is x^ {3} +3x=2x^ {2} +2x + 2
Then 3x + 1=2x^{2}+2x+3 - x^{3}
X = 2 makes the equation hold.
Substitute x = 3 into it
Then 10 = 0

Check 10, then 10\rightarrow5\rightarrow16\rightarrow8\rightarrow4\rightarrow2\rightarrow1

That is, after verification, the Kakutani Conjecture also leads to 1 for 10 in the end.

If x = 3, we can calculate

10 = 0

Checkout 10, then 10\rightarrow5\rightarrow16\rightarrow8\rightarrow4\rightarrow2\rightarrow1

Then: 10 will fall to 1 also.
- 10 = 0
-10\div2=- 5
- 5\times3 + 1=- 14
-14\div2=-7
-7\times3 + 1=-20
-20\div2=-10
-10\div2=-5

For an infinite number \infty, perform the reciprocal operation S = \frac {1} {\infty}, denoted as S = 000000

Since the Bagua Qian in the up-down structure and the Bagua Qian in the left-right structure are equivalent and identical

We can know 000000

Then AOAO = AAA
That is 2A^ {2} =A^ {3}
2A + 2 = 3A

Then A^ {3} +3A=2A^ {2} +2A + 2
3A + 1=2A^ {2} +2A+3 - A^ {3}
When A = 2, equation holds.
When A = 3, then
3A + 1=2A^{2}+2A+3 - A^{3}
10 = 0
Denoted as [= O]

That is, when using a computer to perform the operation of the Kakutani Conjecture, when it comes to an infinite number, there will be a memory overflow, that is, it cannot be verified by a computer.

For example, 20 written in binary is 10100. After folding it in half, there are two cases for the starting number: 1 or 0.

When 20 is written in binary, it can be mathematically expressed as S = E(s)
When the starting number is 1, S = E(s) and s\equiv2\pmod{3}
When the starting number is 0, s/2 and s\equiv0\pmod{2}
Substitute s = 0, s - 1, s + 1 into the Kakutani rule,
We can know that A = 3(0 + 1)+1, T = 3(0 - 1)+1
A + T = 2
Then there exists the Kakutani rule L(0)=1

That is, write 0 on one side of a paper tape and 1 on the other side, twist and connect them, and we can know that the operation rule of the Kakutani Conjecture is a Mobius strip.

After the Collatz Conjecture converts a number into binary and folds it in half, the starting numbers have four possibilities: 1, 0, 10, 11 (in binary). Assume that after the iterative operation of the Collatz Conjecture, it finally falls back to the starting number. Then from L (0) =1, that is, 0 and 1 are equivalent. Since 10 in binary is equal to 2, we can know that A = 2 and equation holds. Since 11 in binary is equal to 3 which is G,

The binary representation of - 5 should be expressed in two's complement, which should be 11111011

(The original code is 10000101, the one's complement is 11111010, and the two's complement is 11111011)

The binary folding of - 5 represented by symbols is GCGG

Then we can know that X=-5 has entered the cycle of -10\rightarrow-5\rightarrow-7\rightarrow-20\rightarrow-10

References

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2. "Asimov's New Guide to Science", Life Formula