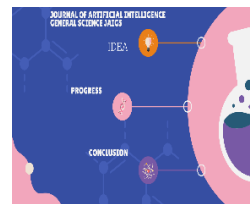




Vol.1, Issue 01, January, 2024
Journal of Artificial Intelligence General Science JAIGS

Home page <http://jaigs.org>



Collatz Conjecture Solution

Gaurangkumar Girishbhai Patel

Applied Business Management, University of Manitoba, Canada

*Corresponding Author: Gaurangkumar Girishbhai Patel

ABSTRACT

ARTICLEINFO

Article History:

Received:

05.03.2024

Accepted:

10.03.2024

Online: 04.04.2024

Keyword: Collatz conjecture, $3n + 1$ conjecture, unsolved problem, arithmetic operations, positive integers, Lothar Collatz, mathematical conjecture

The Collatz conjecture, also known as the $3n + 1$ conjecture, stands as one of the most enduring unsolved problems in mathematics. Proposed by German mathematician Lothar Collatz in 1937, the conjecture poses a deceptively simple question: can iteratively applying two basic arithmetic operations—dividing even numbers by 2 and multiplying odd numbers by 3 and adding 1—lead any positive integer to converge to the value 1? Despite extensive computational verification for vast ranges of integers, a proof or disproof remains elusive. This abstract explores the historical background, various attempts at proving the conjecture, and its implications across mathematical domains.

Introduction

Collatz Conjecture Solution

The Collatz conjecture^[a] is one of the most famous unsolved problems in mathematics. The conjecture asks whether repeating two simple arithmetic operations will eventually transform every positive integer into 1. https://en.wikipedia.org/wiki/Collatz_conjecture

The solution in simple words, all number made out of 1.

Like $1=1$

$2=1+1$

$3=1+1+1$

$4=1+1+1+1$

$5=1+1+1+1+1$

Etc.

I am saying not only 1 is repetitive but 4,2,1 is repetitive.

$3x+1$ in if $x=1$ then, $3(1)+1=4$, then as per rules $4/2=2$ then $2/2=1$ means 4,2,1

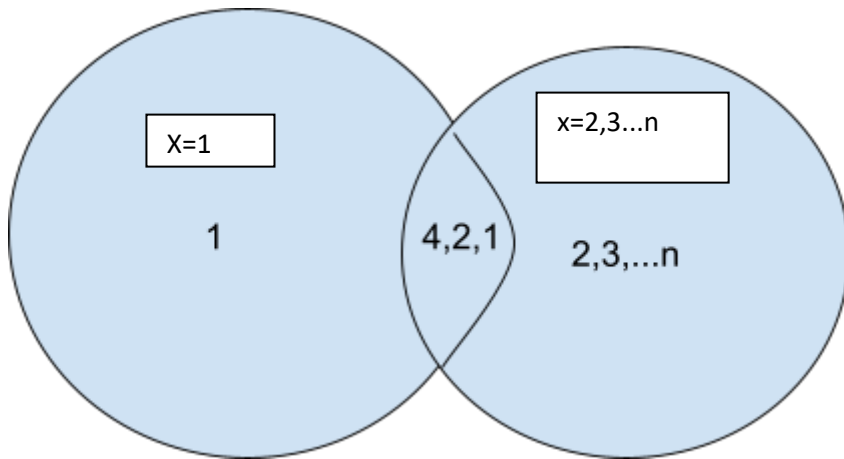
Now if $x=2$ then $3(2)+1=7$ then as per rules $3(7)+1=22$, then $22/2=11$, then $3(11)+1=34$ then $34/2=17$, then $52/2=26$, $26/2=13$, $40/2=20$, $20/10=10$, $10/2=5$, $3(5)+1=16$, $16/2=8$, $8/2=4$, $4/2=2$, $2/2=1$

Now if $x=3$ then $3(3)+1=10$, $10/2=5$, $3(5)+1=16$, $16/2=8$, $8/2=4$, $4/2=2$, $2/2=1$

If we see in all solutions starting from one of the small integers 4,2,1 is repetitive.

Because in $x=3$ there is ans 5.

all happening due to condition: $-my(x+1)$ work same but then only 2,1 is repetitive. We are multiplying by 3 but more than once we are dividing.



All is happening because of Conditions, noting else, if its undividable we add it back to the formula, If put even number in it, 2,4,6... then it's converted by $3X+1$ to 7,13....in odd number. Odd number as X gives us even numbers.

https://en.wikipedia.org/wiki/Collatz_conject

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