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Here is a brief summary for each paper

## 1. Collatz Conjecture

### A. Deciphering the Collatz Conjecture Through Recursion

- <https://zenodo.org/record/5710439>
- Found algebraic expression
  - $3n + 1$  or  $2n + 2$  for all positive odd integers
  - $3n - 1$  or  $2n - 2$  for all negative odd integers
- Key reason for 4 to 2 to 1 loop
  - $3n + 1 = 2n + n + 1$
  - $n + 1$  in  $2n + n + 1$  is designed to reduce all positive odd integer into 2
  - $2n$  ensures that the positive odd integer turns into an even number greater than 2
  - When a positive odd integer is reduced to 1, the  $3n + 1$  will output an even number greater than 2, which in this case is 4. Thus, the loop begins.

### B. The Real Algebraic Expression of the Collatz Conjecture

- <https://zenodo.org/record/5710468>
- $3n + (3^k)$  and the infinite loop follows the pattern of  $[1 \times 3^k, 4 \times 3^k, 2 \times 3^k]$  for any positive odd integer
- $3n - (3^k)$  and the infinite loop follows the pattern of  $[1 \times -(3^k), 4 \times -(3^k), 2 \times -(3^k)]$  for any negative odd integer
- where  $k$  is any positive integer ranging from 0 to 31

## 2. Proving P = NP through the 3-Partition Problem

<https://zenodo.org/record/5710488>

Given the following:

```
set_of_numbers = [20, 23, 25, 30, 49, 45, 27, 30, 30, 40, 23, 18, 55,
                  35, 0, 89, 1, 0, 45, 40, 5, 0, -1, 91, -89, 179, 0, ]
```

- Total steps for finding a match for all the subsets: 10
- Equation used:
  - difference = amount\_per\_subset – (largest\_number + smallest\_number)
- Total steps for all the functions to complete: 20
  - Using an algorithm
    1. Sort ascendingly
    2. If the difference is in the set
    3. Collect then remove subset

### 3. Prime numbers

- The Definition of Prime Numbers Contradicts Its Very Own Existence
  - <https://zenodo.org/record/5710380>
    - Composite numbers are not directly related to prime numbers
    - Prime numbers are created through addition and should not be defined by multiplication
- Existence of Prime Numbers
  - <https://zenodo.org/record/5710433>
    - All prime numbers are odd
    - 1 is a prime number
    - Nonprime numbers are created through addition
    - Composite and nonprime numbers look alike