The Marvellous Proof of The Goldbach's Conjecture

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Abstract

In this paper we present the proof of The Goldbach Conjecture.

MSC: 11P32.

Keywords

Arithmetic String, Goldbach Conjecture, Operations On Sets, Prime Numbers, Relations Between Sets.

Dedicatory

I Dedicate this work for my City Lublin

I. INTRODUCTION

On 7 June 1742, the German mathematician Christian Goldbach wrote a letter to Leonhard Euler in which he proposed the following conjecture: 'Every integer which can be written as the sum of two primes, can also be written as the sum of as many primes as one wishes, until all terms are units'. Euler replied in a last letter: 'Every even integer greater than 2 can be written as the sum of two primes, which is, thus, also a conjecture of Goldbach'. [1]

Let

$$\{(2a+b)b:\ a \in [0,1,2,\dots]\ \wedge\ b \in [3,5,7,\dots]\} = [9,15,21,25,27,33,35,\dots] \wedge$$

$$[3,5,7,\dots] - [9,15,21,25,27,33,35,\dots] = [3,5,7,11,13,17,19,23,29,\dots] = \mathbb{P}.$$

II. THE PROOF OF THE GOLDBACH'S CONJECTURE

Conjecture 1 (Goldbach Conjecture). For all $Z \in \{6,8,10,\dots\}$ and for some $X, Y \in \mathbb{P}$:

$$Z = X + Y.$$

Proof.

$$\{6,8,10,\dots\} = \{\mathbf{6},12,\mathbf{18},24,\mathbf{30},36,\mathbf{42},48,\mathbf{54},60,\mathbf{66},72,\mathbf{78},84,\mathbf{90},96,\dots\} \cup$$

$$\{8,\mathbf{14},20,\mathbf{26},32,\mathbf{38},44,\mathbf{50},56,\mathbf{62},68,\mathbf{74},80,\mathbf{86},92,\mathbf{98},104,\mathbf{110},116,\dots\} \cup$$

$$\{\mathbf{10},16,\mathbf{22},28,\mathbf{34},40,\mathbf{46},52,\mathbf{58},64,\mathbf{70},76,\mathbf{82},88,\mathbf{94},100,\mathbf{106},112,\dots\}.$$

Thus we get

$$[3] \cup [\mathbf{9}, \mathbf{15}, \mathbf{21}, \mathbf{27}, \mathbf{33}, \mathbf{39}, \mathbf{45}, \mathbf{51}, \mathbf{57}, \mathbf{63}, \mathbf{69}, \mathbf{75}, \mathbf{81}, \mathbf{87}, \mathbf{93}, \dots] \cup$$

$$[7,13,19, \mathbf{25}, 31,37,43, \mathbf{49}, \mathbf{55}, 61,67,73,79, \mathbf{85}, \mathbf{91}, 97,103,109, \dots] \cup$$

$$[5,11,17,23,29, \mathbf{35}, 41,47,53,59, \mathbf{65}, 71, \mathbf{77}, 83,89, \mathbf{95}, 101,107,113, \mathbf{119}, \dots] = [3,5,7, \dots].$$

Hence

$$[6] = \{Z:\ Z = X + Y\ \wedge\ X = Y = 3\}\ \vee$$

$$[8] = \{Z:\ Z = X + Y\ \wedge\ X = 3\ \wedge\ Y = 5\}\ \vee$$

$$[14,20,26, \dots] =$$

$$\{Z:\ Z = X + Y\ \wedge\ X \leq Y \wedge\ X, Y \in \mathbb{P}\ \wedge\ X, Y \in [7,13,19, \mathbf{25}, 31,37,43, \mathbf{49}, \mathbf{55}, 61, \dots]\}\ \vee$$

$$[10,16,22, \dots] =$$

$$\{Z:\ Z = X + Y\ \wedge\ X \leq Y \wedge\ X, Y \in \mathbb{P}\ \wedge\ X, Y \in [5,11,17,23,29, \mathbf{35}, 41,47,53,59, \dots]\}\ \vee$$

$$[12,18,24, \dots] =$$

$$\{Z:\ Z = X + Y \wedge\ X, Y \in \mathbb{P}\ \wedge\ X \in [5,11,17,23,29, \mathbf{35}, \dots]\ \wedge\ Y \in [7,13,19, \mathbf{25}, \dots]\},$$

whence it implies that for all $Z \in \{6,8,10, \dots\}$ and for some $X, Y \in \mathbb{P}$: $Z = X + Y$. This is the proof.

Moreover we obtain

$$[42,48,54, \dots] =$$

$$\{Z:\ 42 \leq Z = x + y\ \wedge\ x \leq y\ \wedge\ x, y \in ([3,5,7, \dots] - \mathbb{P}) \wedge\ x, y \in [\mathbf{9}, \mathbf{15}, \mathbf{21}, \mathbf{27}, \mathbf{33}, \dots]\}\ \vee$$

$$[40,46,52, \dots] =$$

$$\{Z:\ 40 \leq Z = x + y\ \wedge\ x, y \in ([3,5,7, \dots] - \mathbb{P}) \wedge\ x \in [\mathbf{9}, \mathbf{15}, \mathbf{21}, \dots] \wedge y \in [7,13,19, \dots]\}\ \vee$$

$$[44,50,56, \dots] =$$

$$\{Z:\ 44 \leq Z = x + y\ \wedge\ x, y \in ([3,5,7, \dots] - \mathbb{P}) \wedge\ x \in [\mathbf{9}, \mathbf{15}, \mathbf{21}, \dots]\ \wedge\ y \in [5,11,17, \dots]\}.$$

Corollary 1. For all $Z \in \{40,42,44, \dots\}$ and for some $x, y \in ([3,5,7, \dots] - \mathbb{P})$ and for some $X, Y \in \mathbb{P}$: $Z = x + y = X + Y$.

REFERENCES

[1] . http://en.wikipedia.org/wiki/Goldbach's_conjecture