THE MARVELLOUS PROOF OF THE GOLDBACH'S CONJECTURE

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I dedicate my work to the city Lublin

Abstract. The proper proof of the Goldbach's Conjecture

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]

II. The Goldbach's Conjecture

Let

$$\mathbb{A} = \{3, 5, 7, ...\} \ \wedge \ \mathbb{P} = \mathbb{A} \backslash \mathbb{A}_o \ \wedge \ \mathbb{P} \cap \mathbb{A}_o = \varnothing \ \wedge$$

$$\mathbb{A}_o = \{(2a + b)\, b : b \in \{3, 5, 7, ...\} \ \wedge \ a \in \mathbb{N}\} = \{9, 15, 21, 25, 27, ...\}.$$

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

$$g = X + Y.$$

This is the conjecture.

Proof.

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

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

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

$$\mathbb{A}_1 = \{3\} \ \wedge \ \mathbb{A}_2 = \{9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, ...\} \ \wedge$$

$$\mathbb{A}_3 = \{7, 13, 19, \mathbf{25}, 31, 37, 43, \mathbf{49}, \mathbf{55}, 61, 67, 73, 79, \mathbf{85}, \mathbf{91}, 97, ...\} \ \wedge$$

$$\mathbb{A}_4 = \{5, 11, 17, 23, 29, \mathbf{35}, 41, 47, 53, 59, \mathbf{65}, 71, \mathbf{77}, 83, 89, \mathbf{95}, ...\} \ \wedge$$

$$\mathbb{A}_3 \backslash \mathbb{P} = \mathbb{A}_5 \ \wedge \ \mathbb{A}_4 \backslash \mathbb{P} = \mathbb{A}_6 \ \wedge \ \mathbb{A}_3 \backslash \mathbb{A}_o = \mathbb{A}_7 \ \wedge \ \mathbb{A}_4 \backslash \mathbb{A}_o = \mathbb{A}_8.$$

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Thus

$$\{42, 48, 54, ...\} = \{g : g = x + y \ \wedge \ x, y \in \mathbb{A}_2 \ \wedge \ x \leq y\} \ \wedge$$

$$\{40, 46, 52, ...\} = \{g : g = x + y \ \wedge \ x \in \mathbb{A}_2 \ \wedge \ y \in \mathbb{A}_5 \ \wedge \ x \neq y\} \ \wedge$$

$$\{44, 50, 56, ...\} = \{g : g = x + y \ \wedge \ x \in \mathbb{A}_2 \ \wedge \ y \in \mathbb{A}_6 \ \wedge \ x \neq y\}\,.$$

Hence for all $g \in \{40, 42, 44, ...\}$ and for some $x, y \in \mathbb{A}_o$:

$$g = x + y. \ \maltese$$

Moreover from the above we get

$$\{6\} = \{g : g = 3 + 3 \ \wedge \ 3 \in \mathbb{A}_1\} \ \wedge$$

$$\{8\} = \{g : g = 3 + 5 \ \wedge \ 3 \in \mathbb{A}_1 \ \wedge \ 5 \in \mathbb{A}_8\} \ \wedge$$

$$\{14, 20, 26, ...\} = \{g : g = X + Y \ \wedge \ X, Y \in \mathbb{A}_7 \ \wedge \ X \leq Y\} \ \wedge$$

$$\{10, 16, 22, ...\} = \{g : g = X + Y \ \wedge \ X, Y \in \mathbb{A}_8 \ \wedge \ X \leq Y\} \ \wedge$$

$$\{12, 18, 24, ...\} = \{g : g = X + Y \ \wedge \ X \in \mathbb{A}_7 \ \wedge \ Y \in \mathbb{A}_8 \ \wedge \ X \neq Y\}\,.$$

Hence for all $g \in \{6, 8, 10, ...\}$ and for some $X, Y \in \mathbb{P}$:

$$g = X + Y.$$

This is the proof. □

Corollary 1. *For all* $g \in \{40, 42, 44, ...\}$ *and for some* $X, Y \in \mathbb{P}$ *and for some* $x, y \in \mathbb{A}_o$*:*

$$g = X + Y = x + y.$$

This is the corollary.

References

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

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