The Goldbach Conjecture

Author Barry Foster

Abstract The Goldbach Conjecture postulates that every even number greater than 4 is the sum of two primes.

Examples of Goldbach Pairs, GP's, are:

6 = 3+3

112 = 3+109 5+107 11+101 23+89 29+83 41+71 53+59

128 = 19+109 31+97 61+67

.

. .

7766 = 7+7759 13+7753 … 3877+3889 (86 solutions)

Proof Euclid proved there is an infinite number of primes. (1)

Bertrand's postulate , (a theorem actually but "postulate " persists in the literature), proves that for any number P the next prime is less than 2P (2)

https://en.wikipedia.org/wiki/Bertrand's_postulate

(1) and (2) imply the Goldbach Conjecture ***may*** be true.

The following table displays ordered data computed from the first 6 primes A and B.

Thus 17>=A>=B>=3

A	3	5	5	7	7	7	11	11	11	11	13	13	13	13	13	17	17	17	17	17	17
B	3	3	5	3	5	7	3	5	7	11	3	5	7	11	13	3	5	7	11	13	17
A+B	6	8	10	10	12	14	14	16	18	22	16	18	20	24	26	20	22	24	28	30	34
2A	6	10	10	14	14	14	22	22	22	22	26	26	26	26	26	34	34	34	34	34	34
2B	6	6	10	6	10	14	6	10	14	22	6	10	14	22	26	6	10	14	22	26	34
A-B	0	2	0	4	2	0	8	6	4	0	10	8	6	2	0	14	12	10	6	4	0

We note that for any prime P there is a group of GP's where P is the larger prime, and in larger GP's it will occur as the smaller, an infinite number of times in fact. from (1)

The GP's 6 … 10, …… $2P_K$ … $2P_{K+1}$ etc are separated by GP's if the conjecture is true.

We note all the differences for A-B: 0,2,4, … , 14 exist as will always be the case because of (2)

Any GP between $2P_K$ and P_{K+1} must have $A<=P_K$.

Further 2A – 2B = (A – B) + (A - B)

2A – (A – B) = 2B + (A – B)

ie A+B exists as the midpoint of 2A-2B

This appears to confirm the conjecture.