Title: Goldbach Conjecture – A Proof (?)

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Abstract: The Goldbach Conjecture may be stated as follows:

Every even number greater than 4 can be written as the sum of two primes.

Examples:

6 = 3+3
8 = 3+5
10 = 3+7; 5+5

We will call the two primes summing to a particular number a Goldbach Pair (GP) for that number.

Consider the following identity for positive even numbers (N,u,v)

$$N = (N-u) + (N-v) - (N-u-v) \qquad \{N>v>=u\} \qquad (1)$$

Assume the even numbers 6, 8, ..., N-2 are GP's so that their component primes are >=3 and <N-3.

i.e. (N-u), (N-v), (N-u-v) are GP's {(N-u-v) >=6}

We must show N is also a GP.

We will restrict the terms we consider in (1) to those where:

$$2N > (N-u) + (N-v) > N \qquad (2)$$

Assume N = (A+B) {(A, B) prime; A>= N/2>=B}

From (1) (A+B) = (A+a) + (B+b) – (N-u-v) {(a, b) prime; B>a>=b}

Where (N-u) = (A+a)
(N-v) = (B+b)
(N-u-v) = (N-u) + (N-v) – N = a+b

Using N = 12 as an example the restrictions (2) allow the following representations for (1).

	N	a+b	u	v	N-u	N-v	N-u-v
(i)	12	3+3	2	4	10	8	6
(ii)	12	3+5	2	2	10	10	8

Thus (i) 12 = 10 + 8 – 6
= (7+3) + (5+3) – (3+3)
= (7+5)

(ii) 12 = 10 + 10 – 8
= (7+3) + (5+5) – (5+3)
= (7+5)

And 12 is a GP as required.

This method may be used for any N apparently.