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 $\{N,u,v\}$:

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

Assume all the even numbers $\{6, 8, ..., N-2\}$ are GP's: we wish to show N is also a GP.

Thus $\quad N = (A+B) \qquad \{(A,B) \text{ prime};\ A>= N/2>=B\}$

$(N-u), (N-v), (N-u-v)$ are GP's $\qquad \{(N-u-v)>=6\}$

In (1) $\quad (A+B) = (A+a) + (B+b) - (N-u-v) \qquad \{(a,b) \text{ prime};\ A>a>=b\}$

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 following table displays eligible values

N	**a+b**	**u**	**v**
12	3+3	2	4
12	6+2	2	2

Therefore (1) occurs in 2 ways:

$$12 = 10 + 8 - 6$$
$$= (7+3) + (5+3) - (3+3) = (7+5)$$

$$12 = 10 + 10 - 8$$
$$= (7+3) + (5+5) - (5+3) = (7+5)$$

And 12 is a GP.

This method may be used for any N apparently.