Title Goldbach Conjecture

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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.

Method

Absent a function for generating every prime this demonstration uses the obvious fact that the prime components of a GP must each be less than the subject number.

Consider the following identity, valid for all real numbers (N,u,v).

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

We will limit our considerations to the set: $\{N, u, v \text{ even}; N>v>=u; N>6\}$ (S)

Further we assume N is the next number in the series {6 8 10 ... N-2} and all the even numbers <N are GP's.

Thus if N is a GP its primes can be found amongst the above numbers <N.

Apparently, under the conditions (S) the following solution to (1) exists but the primes must be found by informed inspection:

$N = (A+a) + (B+b) - (a,b)$ (A,B,a,b are all prime)

Where $(A+a) = (N-u)$
$(B+b) = (N-v)$
$(a+b) = (N-u-v) = E$ say

Thus $u+v = N-E$
$u = B-a$
$v = A-b$

Examples

$N = 12 = (7+\underline{3}) + (5+\underline{3}) - (\underline{3}+\underline{3}) = (7+5)$ A unique solution

$N = 30 = (23+\underline{3}) + (7+\underline{5}) - (\underline{3}+\underline{5}) = (23+7)$ One of several solutions

Etc.