Goldbach’s conjecture

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Abstract

In this article I try to make my modest contribution to the proof of
Goldbach’s conjecture and I propose to simply go through its negation.

Let E be the prime numbers set.

The Goldbach conjecture states that :

\[ \forall k \in \mathbb{N}^*/\{1\} \quad \exists (p, p') \in E^2 / \quad 2k = p + p' \]

Suppose this statement is false, then :

\[ \exists k \in \mathbb{N}^*/\{1\} \quad \forall (p, p') \in E^2 / \quad 2k \neq p + p' \]

Let's consider the cases :

\begin{itemize}
  \item \[ 2k \neq p + p' \] is equivalent to either \[ 2k < p + p' \] or \[ 2k > p + p' \]
  \item in the case \[ 2k < p + p' \], as p and p’ are arbitrary we can set the value of p’ to 2 for example then, \[ 2k - 2 < p \] but \[ k \geq 2 \] then \[ 2 \leq 2k - 2 \] so \[ \forall p \in E \quad 2 < p \] it does mean that 2 is not prime! which is absurd
  \item in the case \[ 2k > p + p' \] then for \[ p' = 2, \] \[ p < 2k - 2 \] so E is bounded and this is absurd too.
\end{itemize}

So, the negation of Goldbach statement is false.

Conclusion : The Goldbach’s conjecture is true.

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