ON EXPLORING THE EQUIVALENCE OF THREE DIFFERENT CLASSES CONSISTING PRIME PAIRS: THE TWIN PRIME PATTERNS SURROUNDING LARGE EVEN INTEGERS

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ABSTRACT

The 'Goldbach conjecture' simply states that, every even integer (≥ 6) can be expressed as the sum of two primes. Mathematicians have tried to prove it analytically, from the centuries. Unfortunately, all such attempts, leaving us with void certainty. We have utilized the 'Goldbach's conjecture' to extend it. In this study, we've strengthened the conjecture by imparting two hypotheses. Our objective relies upon the necessity of 'unveiling the twin prime pattern with even integers'. In this article, we have illustrated two hypotheses, based on our intriguing observations. We insist that, in the sum of two primes that represent an even integer (≥ 6), at least one of these primes must belong to a twin prime pair. For convenience consider three numerical examples: Taking $8 = (3 + 5)$. Here (3,5) constitutes twin prime pair. For $20 = (3 + 17)$, where (3,5) and (17,19) constitutes twin prime pairs independently. For taking $52 = (5 + 47)$, where 5 is part of a twin prime pair (5,7), but 47 is isolated prime. On further exploration, we have shown, the sum of twin prime pair representing an even integer ($\geq$36); can be expressible as sum of primes (both primes individually constitute twin prime pair), and sum of primes (one isolated prime, another prime constitute twin prime pair). For instance, consider the twin prime pair (617,619), on addition $(617+619) = 1236 = (5+1231) = (1193+43)$; (5,7), (1229,1231) are individual twin prime pairs; 1193 is an isolated prime, (41,43) is a twin prime pair. To establish the truthfulness, we've conducted extensive computational checks on these hypotheses. Examining numbers up to , our results confirm its validity (using Python software). Yet, like its predecessor, the Goldbach Conjecture, proving these hypotheses mathematically is likely to be an exceptionally challenging endeavor.

***K*eywords** Primes · The Goldbach's Conjecture · The Twin Primes

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