Understanding and Attempting Proof of Goldbach Conjecture

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1 Introduction

In this article, we attempt to proove or provide a better understanding of this well known problem. Here, we also ignore obvious mathematical terms and facts. Most computer science and mathematics graduates will have sufficient background to understand the content. We also ignore very edge cases and focus on the way of thinking. We also do not attempt to proof obvious facts.

2 Definitions

N-multiple

An integer has n prime repeatable integer factors. $n \in \mathbb{N} \setminus 1$. Examples, 2×3,$2 \times 2 \times 3$ and $3 \times 5 \times 7$.

Odd Multiple

We only use nature numbers as the factors, in this case, 1 and 2 are removed.

3 Axioms

Axiom (Prime number):
Prime numbers are the holes in odd numbers such that odd multiples fail to fill in. It can also be understood as nature numbers subtract even numbers and odd multiples.

Axiom (Neighor Numbers are Co-prime):
Or 邻数因子互斥 in Chinese. Given any number n, n and $n+1$ are co-prime. If we put n in unique factorial format eg $p_1^{e_1} \cdot p_2^{e_2} \cdots p_l^{e_l}$, it will be more obvious $p_1^{e_1} \cdot p_2^{e_2} \cdots p_l^{e_l} + 1$ does not share any factor with n. Further $n-1$ does not share any factor with n.

Axiom (Neighboring Zone Factorization Analysis):
For number sequence n, $n-1$, $n-i$, $\cdots$, $n-m$, $m < n$. We call i the δ. In this zone, each smaller number only share factors with larger numbers that are factors of current δ and previous δs. When δ is prime and larger than any factors from applicable δs, it will force in a prime that is never used in larger numbers' factorization.

4 Application in Goldbach Conjecture

Let's try with 85292 to show how to calculate the Goldbach prime pair 79 and 85213, partly manual with computer program aid. I also use Chatgpt aiding Latex writing. Pay attention to steps at $m = 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 47, 53, 67, 71, 73, 79$.

Proof of Goldbach Conjecture. In zone $[n-m, n]$, each time a new prime never used is forced in when δ is a prime. Combining the distinct primes used in even numbers, the primes less equal to $\sqrt{n}$ soon run out. We can only fill in one but ONLY ONE prime that is bigger than $\sqrt{n}$. □

Table 1: n=85292

$n-m$	**Factorization of** $n-m$	$-m$
85212	2×2×3×3×3×3×263	-80
85213	85213	-79
85214	2×137×311	-78
85215	3×5×13×19×23	-77
85216	2×2×2×2×2×2663	-76
85217	11×61×127	-75
85218	2×3×7×2029	-74
85219	31×2749	-73
85220	2×2×5×4261	-72
85221	3×3×17×557	-71
85222	2×42611	-70
85223	85223	-69
85224	2×2×2×3×53×67	-68
85225	5×5×7×487	-67
85226	2×43×991	-66
85227	3×28409	-65
85228	2×2×11×13×149	-64
85229	85229	-63
85230	2×3×3×5×947	-62
85231	29×2939	-61
85232	2×2×2×2×7×761	-60
85233	3×28411	-59
85234	2×19×2243	-58
85235	5×17047	-57
85236	2×2×3×7103	-56
85237	85237	-55
85238	2×17×23×109	-54
85239	3×3×3×7×11×41	-53
85240	2×2×2×5×2131	-52
85241	13×79×83	-51
85242	2×3×14207	-50
85243	85243	-49
85244	2×2×101×211	-48
85245	3×5×5683	-47

$n-m$	**Factorization of** $n-m$	$-m$
85246	2×7×6089	-46
85247	85247	-45
85248	2×2×2×2×2×2×2×2×3×3×37	-44
85249	163×523	-43
85250	2×5×5×5×11×31	-42
85251	3×157×181	-41
85252	2×2×21313	-40
85253	7×19×641	-39
85254	2×3×13×1093	-38
85255	5×17×17×59	-37
85256	2×2×2×10657	-36
85257	3×3×9473	-35
85258	2×47×907	-34
85259	85259	-33
85260	2×2×3×5×7×7×29	-32
85261	11×23×337	-31
85262	2×89×479	-30
85263	3×97×293	-29
85264	2×2×2×2×73×73	-28
85265	5×17053	-27
85266	2×3×3×3×1579	-26
85267	7×13×937	-25
85268	2×2×21317	-24
85269	3×43×661	-23
85270	2×5×8527	-22
85271	71×1201	-21
85272	2×2×2×3×11×17×19	-20
85273	269×317	-19
85274	2×7×6091	-18
85275	3×3×5×5×379	-17
85276	2×2×21319	-16
85277	53×1609	-15
85278	2×3×61×233	-14
85279	107×797	-13
85280	2×2×2×2×2×5×13×41	-12
85281	3×7×31×131	-11
85282	2×42641	-10
85283	11×7753	-9
85284	2×2×3×3×23×103	-8
85285	5×37×461	-7
85286	2×42643	-6
85287	3×28429	-5
85288	2×2×2×7×1523	-4
85289	17×29×173	-3

$n-m$	**Factorization of** $n-m$	$-m$
85290	2×3×5×2843	-2
85291	19×67×67	-1
85292	2×2×21323	0

5 Final Words

It is still a little bit surreal for me to get here. I have sufficient background in computer science and mathematics in understanding what I am doing. But Number Theory is not my specialty and particularly I aimed too high for this conjecture. I hope the readers please do not be afraid to criticize any mistakes. I hope if the conjecture is not rigidly proved here, at least my article may provide any meaningful clues for further research. Though this is not my first academic writing, still these ”final words” may serve an ”excuse me” if there is any grieve mistake. Solute the all the people dedicate to research in computer science and mathematics.