Attempt to prove Fermat’s Last Theorem

By

Md Shahibur Rahman Miyad

Things are impossible just because we think so

Introduction:

It is quiet impossible to prove Fermat’s last theorem not only to me but also to all the mathematicians except Sir Andrew Wiles who published a complete proof of it in 1995(my birth year!). It might be remain impossible to me to prove it through my lifetime. But some facts about Fermat’s last theorem come to me when I think about it and its proof. These results, want to write here from today Monday, August 14, 2017.

Fermat’s Last Theorem

Statement: The equation has no non-zero integer solution (x,y,z) for any integer n 2

Proof:

[ analogy: throughout our discussion we use “solution” instead of “non-zero integer solution” indicating identical meaning.]

We want to focus on the following equation for integer n ≥ 3

Claim1:

if there is no solution of eqn(1) when (i) n is odd prime number

and when (ii) n is a power of 2

then it is obvious that there is no solution of for any integer n 2

proof of claim1:

let our claim is incorrect. We assume that there is at least one non-zero integer solution of eqn(1) though there is no such a solution when n is odd prime or power of 2.

Let m is not odd prime or power of 2 (m) but has solution. Now m is composite, and m is not a power of 2 so m must have an odd prime factor say p(p≥3). let   
 ⟹ m = pq

So, ⟹ has integer solution.

Hence we have found a equation Xp +Yp = Zp (here X = xq,Y=yq,Z=zq)having an integer solution where p is an odd prime which contradicts our initial assumption that claim1 is incorrect. So our claim1 is correct.

First, we’ll try to prove the theorem when n is odd prime number.

Claim2:

if there is no solution when x,y,z are pairwise co-prime numbers then there is no solution of eqn(1) for any integer n(letter we’ll omit the term “for any integer n”)

proof of claim2:

let our claim is wrong. So there exists a solution of eqn(1) where at least one pair of following three pairs (x,y),(x,z),(y,z) is not co-prime though there is no solution when x,y,z are pairwise co-prime numbers.

Let gcd of x and y is d so x = k1d,y=k2d where k1 and k2 are co-prime.

Now  (k1d)n + (k2d)n = zn dividing both sides by dn we have

k1n +k2n = ()n k1n +k2n = k3n ……………………………………………..(2)

where k3=

as k1 and k2 are integers ,eqn(2) says that k3 is also an integer.

Now let the gcd of k2 and k3 is d1 , so, k2=d1b, and k3=d1c where b and c are co-primes

Therefore , eqn(2) implies

k1n +(d1b)n =(d1c)n

dividing both sides by d1n we have

(k1/d1)n+bn = cn ⟹an+bn = cn where a =

as b and c are integers a is also an integers, so d1 divides k1

so d1 divides both k2 and k1(as d1 is gcd of k2 and k3)

Therefore, d1 divides the gcd of k1 and k2

But k1 and k2 are co-prime , so their gcd is 1

So,d2 = 1 which assures that k2 and k3 are co-prime.

Similarly we can show that k1 and k3 are co-prime to each other.

So,k1,k2 andk3 are pairwise co-prime numbers

So, k1n +k2n = k3n has solution as eqn(1) has a solution and here k1,k2 andk3 are pairwise co-prime numbers which contradicts our initial assumption that our claim2 was wrong. So, our claim2 is correct.