Seventeenth Century Mathematics proof for Fermat's last theorem (FLT)

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Abstract- Properties of the expression X^3 + Y^3 + Z^3 - 3XYZ has been exploited to prove FLT.

I. INTRODUCTION

Fermat's last theorem announced during 17th century by Father of Number Theory Fermat without giving a proof, though claiming he had a proof. It took nearly 358 years to prove the result using modern mathematics of 20th century, whereby mathematicians were divided and some of them claimed that the proof should contain only 17th century mathematics. I belong to the second group and now I am presenting 17th century mathematics proof for FLT using very elementary concepts.

II. PROBLEM

$X^n + Y^n = Z^n$ $(n>2)$ has no solution in integers.

III. PROOF

The expression $X^3 + Y^3 + Z^3 - 3XYZ$ also denoted as (X, Y, Z) in short-form and also called a triple (X, Y, Z) since it has three variable possesses a beautiful property that its nth power is of the same triple form.

We have the factorization

$(a, b, c) = a^3 + b^3 + c^3 - 3abc = (a + b + c)\{(a - b)^2 + (b - c)^2 +(c - a)^2\}/2$

Nine times any number can be represented as a triple stated above for, $(a-1, a, a+1) = 9a$

Also, we have the formula $(a, b, c) \times (p, q, r) = (ap + bq + cr, bp + cq + ar, cp + aq + br)$

Hence nth power of a triple is again a triple of same type.

$a^n + b^n = c^n$ same as $(9a)^n + (9b)^n = (9c)^n$ which is same as

$A^n + B^n = C^n$ and this becomes on expansion

$(a^3 + b^3 + c^3 - 3abc) + (d^3 + e^3 + f^3 - 3def) = l^3 + m^3 + n^3 - 3lmn$

It has been established that sum of two cubes cannot be equal to another cube.

Hence, $a^3 + d^3$ not equal to l^3, $b^3 + e^3$ not equal to m^3, $c^3 + f^3$ not equal to n^3

AND abc + def may or may not be equal to lmn.

In either case LHS is not equal to RHS.

Hence, no solution for the given Diophantine equation.

Is it not simple, elegant, efficient and elementary proof for FLT?

IV. COROLLARY

1. " The above proof throws light on the case n=2 for,

$(a, b, c)^2 = (a^2 + b^2 + c^2, ab + bc + ca, ab + bc + ca)$ "

Note the repetition of the term ab + bc + ca

2. FLT holds good even for negative n.

$A^{(-n)} + B^{(-n)} = C^{(-n)}$

That is

$(BC)^n + (CA)^n = (AB)^n$

Hence the result follows from the above proof.

3. Also, we have the result, $2^3 + 4^3 + 14^3 + 16^3 + 31^3 + 32^3 + 40^3 + 41^3 + 52^3 = 70^3$

This example has the special property that the bases when multiplied by 12345679 leads to 9 digit numbers with one digit missing out of 10 with different permutations.

Applying the same argument to the example stated as above, we may arrive at a new special result since sum of three cubes is equal to another cube.

Thesis contents

1. Streamline of the irreducible case of the cubic - Discovery of cosine trisection quartics dealing with trisection of angles.
2. ex-in identity dealing with the radii of in-circle and ex-circles of a Pythagorean triangle.
3. Infinitude of Mersenne Primes - Proof
4. 10^m is congruent to -1(mod P) and its applications.
5. Recreational mathematics.