Fermat's Last Theorem as a consequence of the little one

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Abstract

In one of Fermat's equivalent equalities, the 3rd digit in the sum of powers a^n+b^n-c^n is not zero and there is a single-valued function of only the last digits a', b', c'; therefore it cannot be zeroed out with the 2nd and 3rd digits in the sum of bases a+b-c.
Apart from the simplest foundations of the theory of a prime number and the consequences of the little theorem, this is, strictly speaking, the proof of the FLT in the first case.
See the proof of the second case here: https://vixra.org/pdf/1908.0072v1.pdf .

In memory of wife, mother and grandmother

Fermat's Theorem:
Equality (for prime degree n>2; все числа даны в базе n)
1*) $a^n+b^n-c^n=0$ in positive integers a, b, c does not exist.

The notation and lemmas /Pour les preuves des lemmes, voir l'annexe in https://vixra.org/pdf/1908.0072v1.pdf и https://vixra.org/pdf/1707.0410v1.pdf)

a', a'', a''' - 1st, 2nd, 3rd digit from the end in the number a;
$a_{[2]}$, $a_{[3]}$, $a_{[4]}$ - two-, three-, four-digit ending of the number a;
nn - n*n.

S(g), $S(g^n)$, $S(g^{nn})$, - sum of g, g^n, g^{nn}, g=1, 2, … n-1, G=(1, 2, … n-1), where
L1a. $S(g^1)_{[2]}=0v$ with the second digit v=(n-1)/2 (see sum of arithmetic progression);
$S(g^n)_{[3]}=00v$; $S(g^{nn})_{[4]}=000v$; etc. (When calculating the sums, the terms are pre-summed in pairs equally spaced from the ends of the series.)

If digit a' is not 0, then
L1. $(a^{n-1})'=1$ (Fermat's little theorem); $(a^{n-1})^n{}_{[2]}=01$; $(a^{n-1})^{nn}{}_{[3]}=001$.
L1c. $(a'^n-a')_{[1]}=0$; $(a'^{nn}-a'^n)_{[2]}=0$; $(a'^{nnn}-a'^{nn})_{[3]}=0$.

L2a (key!). There is such a digit d that the second digit $(d^n)''$ in the number d^n is not zero. (Indeed, if second digits in all d^n are equal to zero, then the second digit of the sum of the number series d^n, where d = 1, 2, ... n-1, is not zero and is equal to (n-1)/2, which is incorrect. See L1a.)
L2b. Similarly: there is a digit d such that digit $(d^{nn})'''$ is not zero.

L2c. There is a digit d such that the digit $[d^{nn}(a^{nn}+b^{nn}-c^{nn})]'''$, where (a+b-c)'=0 и (abc)'=/=0, is not zero. (The proof is the same as in the case of L2a.)

L3. For k>1, the k-th digit in the number a^n does not depend on the k-th digit of the base a. (Corollary from Newton's binomial in prime base.)
L3a. Consequence. If a' is not equal to 0, then digits $a^n{}_{[2]}$ and $a^{nn}{}_{[3]}$ are functions of only a' and do not depend on the digits of higher ranks.

2a*) In Fermat's equality 1* two-digit endings of numbers a, b, c, not multiples of n, there are two-digit endings of degrees a'^n, b'^n, c'^n.

2b*) Therefore, the number a (like b and c) can be represented as $a=a'^n+An^2$, where $A=(a-a_{[2]})/n^2$, and the number a^n (and b^n and c^n) can be represented as

3*) $a^n=(a'^n+a°n^2)^n=a'^{nn}+An^3$ (similarly for b^n and c^n), with the value $(a'^{nn}+b'^{nn}-c'^{nn})_{[3]} = 0$ in the original equality 1*.

And now the equality 1 * can be written by four-digit endings in the form:

4*) $(a'^{nn}+b'^{nn}-c'^{nn})_{[4]} + (a+b-c)'n^3 + Fn^4 = 0$.

<u>Proof of the last theorem in the first case - (abc)' =/= 0</u>

According to L2c, in at least one of the n-1 equivalent equalities obtained from equality 1* by multiplying it by the numbers g^{nnn}, where g = 1, 2, ... n-1, the third digit in the number $(a^n+b^n-c^n)$ Is NOT equal to zero, since two-digit endings of the base a, b, c are two-digit endings of degrees a'^n, b'^n, c'^n (see 2a*), and three-digit endings of degrees a^n, b^n, c^n are three-digit endings of degrees a'^{nn}, b'^{nn}, c'^{nn}, which are single-valued functions of only the last digits a', b ', c' and, therefore, by changing the values of the second and third digits of the bases a, b, c, **<u>the value of the third digit cannot be changed!</u>**

Thus, in one of the equivalent equalities 1a*, the third digit of the number $a^n+b^n-c^n$ is not equal to zero, which proves the truth of the first case of FLT.

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