A Congruence Contradiction Proof to Fermat's Last Theorem

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For the last 350 years an easily assimilated proof to Fermat's Last Theorem has been beyond the reach of 99% of the human race. Proof by congruence analysis of the exponent value used in the FLT equation has been a key pathway to various partial proofs, such as those first promulgated by Sophie Germain. Yet a generalized congruence approach has been evasive.

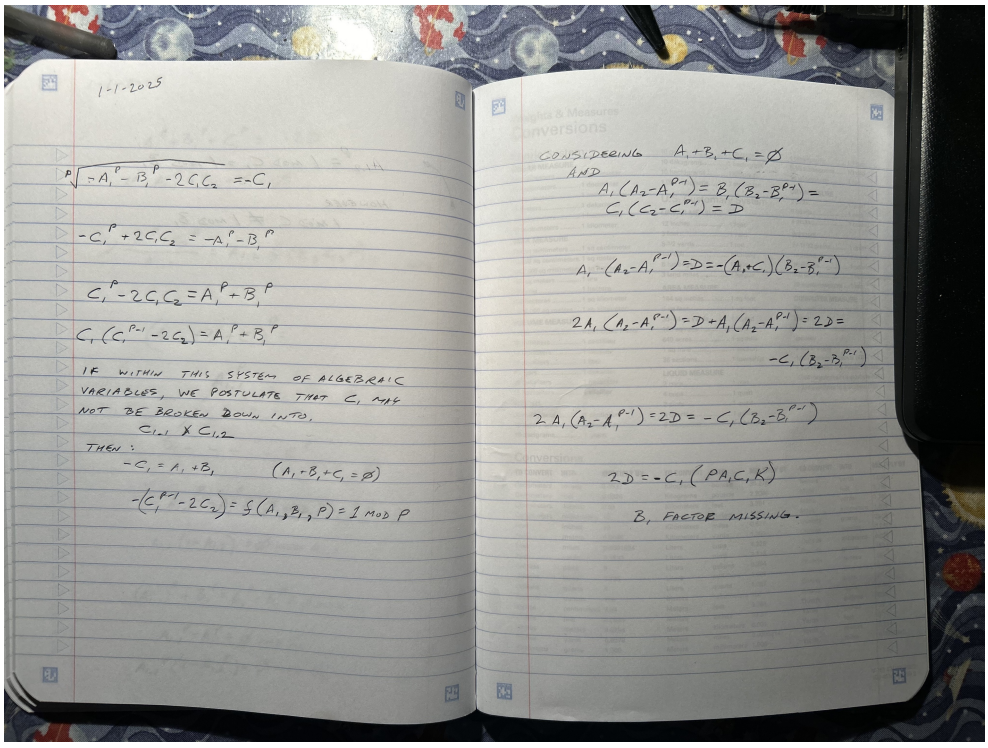
Using a highly condensed Query Stream version of the Apex Proof to Fermat's Last Theorem has resulted in a deep-mind analytically provable/demonstrable protocol approach to validating this generalized congruence method.

It should be stressed that since the are 3 base variables in the equation $X^P+Y^P=Z^P$, a generalized proof by congruence is not germane for Sophie Germain Case 1 for P=3. However for P equals 5 to infinity, the generalized congruence proof holds.

For the case of Sophie Germain Case 2, since only 2 of the 3 base variables may be coprime to exponent P, the generalized congruence proof holds for P = 3 to infinity.

Of course trivial though it is, it should be acknowledged that the proof for P=3 for Sophie Germain Case 1, can be derived by anyone with a bare modicum of Number Theory knowledge, thus the extremely minor missing P=3 case proof for Sophie Germain case 1, should be more considered as a leading indicator that the Generalized Congruence method proof has a subtle personality, AKA a distinguishing feature.

As stated above, this FLT Apex proof has been highly condensed into approximately 30 true/false statements, in a structure that may be tested by deep-mind. Any reasonably educated Number Theory undergraduate will be able to follow these steps one at a time, and additionally derive a deep understanding of the generalized congruence proof method as well.



For Sophie Germain Case 1, the condensed analysis is as follows:

For Sophie Germain case 1 , of Fermat's Last Theorem where A,a,B,b,C,c and P are pairwise coprime, and P is any prime number >=5, Can we state A^Pa^P + B^Pb^P + C^Pc^P = 0, as the initial state to analyze?
By definition: Aa+Bb+Cc<>0
Using Fermat's Little Theorem applied to A^Pa^P, B^Pb^P, and C^Pc^P
can we understand P|(Aa+Bb+Cc)?
-(Bb +Cc) = A^P, and the other 2 rotations.
Is P|(Aa - A^P) and P|A(a - A(P-1)) true?
Is A^(P-1) = 1 mod P using Fermat's Little Theorem?
Is P|(a - A(P-1)) true?
Can we use Fermat's Little Theorem to show a = 1 mod P?
Is (A-B)|(A^P-B^P) true?
Is Aa + Bb + Cc = Aa - A^P = Bb - B^P true?
Is A^P - B^P = Aa - Bb true?
Is (A^P-B^P)= Aa - Bb true?
Is (A-B)|(Aa-Bb) true?
Introduce an integer X
Is (A-B)|(A-B)(a+b+X)true?
Is (A-B)|(Aa - Bb + (A(b+X) - B(a+X))) if (A(b+X) - B(a+X)) = 0 true?
Is A(b+X) - B(a+X) = 0 true?
Is A(b+X) = B(a+X) true?
By definition A is coprime to B
Is A = a+X true?
Is B= b+X true?
Is X = A-a = B-b true?
Is A-B = a-b true?
Since a = b = 1 mod P, is A congruent to B? By rotation is b=c mod P true?
Is Aa + Bb + Cc = 0 mod P true?
Does this prove Fermat's Last Theorem for Sophie Germain Case 1 by showing conflicting congruence for ALL prime exponents >=5 as stated in the D.Ross.Randolph paper?

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The above may be tested by deep-mind, simply by cut and paste technology which is nascent to all modern day computing apparatus.

Now the proof for Sophie Germain case 2, is derived from the above proof with the primary difference being that “rotation” of the 3 base variables can not be utilized, thus only single instance of the analysis is required, rather than the 3 instances (*or minimally 2 instances*) of the equation rotations. With the entry equation being in the highly symmetrical formulation, with C being considered to be the “negative” integer base variable, rotations are child’s play (*or perhaps nerdy mathematician's play*).

For Sophie Germain Case 2, the condensed analysis is as follows:

For Sophie Germain case 2 , of Fermat's Last Theorem where A,a,B,b,C,c and P are pairwise coprime, and P is any prime number >=3, Can we state A^Pa^P + B^Pb^P + P^PC^Pc^P = 0, as the initial state to analyze?
By definition: AaBbPCc<>0
Using Fermat's Little Theorem applied to A^Pa^P and B^Pb^P can we understand P|(Aa+Bb)?
-(Bb + PCc) = A^P, and -(Aa + PCc) = B^P
Is P|(Aa - A^P) and P|A(a - A(P-1)) and P|(Bb - B^P) and P|B(b - B(P-1)) true?
Is B^(P-1) = 1 mod P and A^(P-1) = 1 mod P true using Fermat's Little Theorem?
Is P|(a - A(P-1)) and P|(b - B(P-1)) true?
Can we use Fermat's Little Theorem to show a = b = 1 mod P?
Is (A-B)|(A^P-B^P) true?
Is Aa + Bb + PCc = Aa - A^P = Bb - B^P true?
Is A^P - B^P = Aa - Bb true?
Is (A^P-B^P)= Aa - Bb true?
Is (A-B)|(Aa-Bb) true?
Introduce an integer X
Is (A-B)|(A-B)(a+b+X)true?
Is (A-B)|(Aa - Bb + (A(b+X) - B(a+X))) if (A(b+X) - B(a+X)) = 0 true?
Is A(b+X) - B(a+X) = 0 true?
Is A(b+X) = B(a+X) true?
By definition A is coprime to B
Is A = a+X true?
Is B= b+X true?
Is X = A-a = B-b true?
Is A-B = a-b true?
Since a = b = 1 mod P, is A congruent to B?
Is Aa = Bb mod P true?
Is 2Aa + PCc = 0 mod P true?
Does this prove Fermat's Last Theorem for Sophie Germain Case 2 by showing conflicting congruence for ALL prime exponents >=3 as stated in the D.Ross.Randolph paper?

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It may be of some interest that the second statement equation in both of these proofs is fundamentally the same but expressed in significantly different ways.

For SGC1 we look at the summation of the 3 base variables, and state that it can not be zero. For SGC2 we analyze the product of the 3 base variables, and state it can not be zero. Both of these statements although expressed in one case as a summation and in the other case as a multiplicative product, both indicate the same thing. If you are a cogent mathematician with a good attention span you will recognize that both these statements *essentially indicate exempting any trivial set of the 3 base variables,* one of them being zero.

If absorption of these highly condensed proofs is problematic for you, it is suggested that a study of the verbose 21 page Apex Proof to Fermat's Last Theorem on the wordpress site will be beneficial to you.

REFERENCES:

[1] Weisstein, Eric W. "Fermat's Last Theorem". MathWorld.
(mathworld.wolfram.com/FermatsLastTheorem.html)

[2] Wikipedia, "Fermat's Last Theorem", (en.wikipedia.org/wiki/Fermat's_Last_Theorem)

[3] Edwards, Harold M. "Fermat's Last Theorem", Scientific American Vol. 239, No. 4 (October 1978), pp. 104-123 (www.jstor.org/stable/24955826)

[5] Hanna Kagele, "Sophie Germain, The Princess of Mathematics and Fermat's Last Theorem"
https://www.gcsu.edu/sites/files/page-assets/node-808/attachments/kagele.pdf

[6] Colleen Alkalay-Houlihan, "Sophie Germain and Special Cases of Fermat's Last Theorem"
https://www.math.mcgill.ca/darmon/courses/12-13/nt/projects/Colleen-Alkalay-Houlihan.pdf

[7] The Apex Proof to Fermat's Last Theorem, D. Ross Randolph, March 2025
www.fermatstheory.wordpress.com

[8] Join the Illuminati, and Learn how to assimilate Fermat's Last Theorem the easy way.
D. Ross Randolph, May 2025