**Generalized Fermat’s Last Theorem(1) **

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**Abstract:** In this paper we prove  has infinitely many nonzero integer solutions. We prove  has no nonzero integer solutions.

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**Keywords:** Generalize; Fermat’s Last Theorem; 

In this paper we prove  has infinitely many nonzero integer solutions. We prove  has no nonzero integer solutions.

We define the supercomplex number [1,2,3]

 （1）

where  denotes a  root of unity, ,

Then from (1)

 （2）

Then from (2) we have the modulus of supercomplex number

 （3）

where

, （4）

, （5）

We prove that (3) has infinitely many nonzero integer solutions.

We define the stable group [1,4]

 （6）

where

g.

**Theorem** 1. Suppose  and . Then from (3) and (5)

 （7）

when  from (2)

 （8）

which are the homogeneous and irreducible polynomials.

 （9）

 （10）

If  has nonzero integer solutions, then  also has nonzero integer solutions, and vice versa.

Put , , where  is an odd number.

From (7) and (9)

, （11）

 （12）

Put , , where  is an .odd number.

Suppose  and . From (3) and (5)

 （13）

Put , , where  is an odd number. (7), (11) and (12) are the same equation. We prove that every

 （14）

has infinitely many nonzero integer solutions.

Hence (7), (12) and (13) have infinitely many nonzero integer solutions.

**Theorem 2**. Suppose  and . Then from (3) and (5)

 （15）

when  from (2)

 （16）

which are the homogeneous and irreducible polynomials.

From (6)

 （17）

 （18）

If  has no nonzero integer solutions then  has no nonzero integer solutions, and vice versa [1,5]

Euler prove that (15) has no nonzero integer solutions. Hence  and  have no nonzero integer solutions.

From (15) and (17) we have

, （19）

 （20）

From (18)  has no nonzero integer solutions, Hence (20) has no nonzero integer solutions, Euler prove that (20) has no nonzero integer solutions, hence  and  have no nonzero integer solutions.

Suppose  and  from (3) and (5)

 （21）

Euler prove (21) has no nonzero integer solutions, hence  also has no nonzero integer solutions.

We prove that every

 （22）

has no nonzero integer solutions. Hence we prove that (15), (20) and (21) are the same equation and have no nonzero integer solutions.

**Theorem 3**. when ,  and  are homogenous and irreducible polynomials. Suppose . From (3) and (5)

 （23）

From (18)  has no nonzero integer solutions. Hence (23) has no nonzero integer solution.

From (17) and (23) we have

, （24）

 （25）

From (18)  has no nonzero integer solutions, Hence (25) has no nonzero integer solutions.

Suppose  and . From (3) and (5)

 （26）

We prove that every

 and  （27）

has no nonzero integer solutions.

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