**Fermat Last Theorem was Proved in 1991**

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**Abstract**: We found out a new method for proving Fermat last theorem (FLT) on the afternoon of October 25, 1991. We proved FLT at one stroke for all prime exponents , It led to the discovery to calculate . To this date, no one disprove this proof. Anyone can not deny it, because it is a simple and marvelous proof. It can fit in the margin of Fermat book.

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**Keywords**: Fermat last theorem (FLT); prime; exponent; marvelous proof; book.

We found out a new method for proving Fermat last theorem (FLT) on the afternoon of October 25, 1991. We proved FLT at one stroke for all prime exponents , It led to the discovery to calculate . To this date, no one disprove this proof. Anyone can not deny it, because it is a simple and marvelous proof. It can fit in the margin of Fermat book.

In 1974 we found out Euler formula of the cyclotomic real numbers in the cyclotomic fields [1].

, (1)

where  denotes a - th root of unity, ,  is an odd number,  are the real numbers.

 is called the complex hyperbolic functions of order  with  variables,

, (2)

where

,

. (3)

Using (1) the cyclotomic theory may extend to totally real number fields. It is called the hypercomplex variable theory [1]. (2) may be written in the matrix form

,

(4)

where  is an even number.

From (4) we may obtain its inverse transformation

. (5)

From (5) we have

,

 (6)

In (3) and (6)  and  have the same formulas such that every factor of  has a Fermat equation. Assume , ,  where ,  are  indeterminate equations with  variables. From (6) we have

,  （7）

From (3) and (7) we may obtain the Fermat equation

 (8)

**Theorem**. Fermat last theorem has no rational solutions with  for all odd exponents.

**Proof**. The proof of FLT is difficult when  is an odd prime. We consider  is a composite number.

Let , where  ranges over all odd number. From (3) we have

 (9)

From (7) we have

 (10)

where  is a factor of . From (9) and (10) we may obtain Fermat equation

 (11)

Every factor of  has a Fermat equation. From (11) we have

 (12)

 (13)

 (14)

If  and , then . Euler proved (13), therefore (11) has no rational solutions with  (and so no integer solutions with ) for all odd exponents . (11) and (13) can fit in the margin of Fermat book.

Let  where  is an odd prime. From (3) and (7) we may derive Fermat eqations

 (15)

 (16)

 (17)

Euler proved (15) and (16), therefore (17) have no rational solutions with  (and so no integer solutions with ) for any odd prime . (15)-(17) can fit in the margin

Let  where  is an odd prime. From (3) and (7) we may derive Fermat eqations

 (18)

 (19)

 (20)

(18)-(20) can fit in the margin.

Let  where  is an odd prime. From (3) and (7) we may derive Fermat equations

 (21)  (22)

 (23)

(21)-(23) can also fit in the margin.

Using this method we proved FLT in 1991 [2-5].

Let  where  is an odd prime. From (3) and (7) we have

 (24)

Let  and  From (24) we have

 (25)

 (26)

The proof of (25) is transformed into studying (26). (26) has no rational solutions with ,

because  is an irrational number for . Therefore (25) has no rational solutions for

any odd prime . (25) and (26) can also fit in the margin.

**Remark**. If , where  then (11)-(23) have infinitely many rational solutions [1].

**Note:**

Let one knew the important results, we gave out about 600 preprints in 1991-1992. There were my preprints in Princeton, Harvard, Berkeley, MIT, Uchicago, Columbia, Maryland, Ohio, Wisconsin, Yale, … …, England, Canada, Japan, Poland, Germany, France, Finland, … …, Ann. Math., Mathematika, J. Number Theory, Glasgow Math. J., London Math. Soc., In. J. Math. Math. Sci., Acta Arith., Can. Math. Bull. (They refused the publicaitons of my papers). Both papers were published in Chinese. FLT is as simple as Pythagorean theorem. This proof can fit in the margin of Fermat book. We think the game is up. We sent dept of math (Princeton University) a preprint on Jan. 15, 1992. Wiles claims the second proof of FLT in England (not in U. S. A.) after two years. We wish Wiles and his supporters disprove my proof, otherwise Wiles work is only the second and complex proof of FLT. We believe that the Princeton is the fairest University and history will pass the fairest judgment on proofs of FLT and other problems. We are waiting for word from the experts who are studying this paper.

**Preprint (January 1994).**

**After Wiles was about to announce his proof of FLT to the world on June 23, 1993. Jiang wrote this paper.**

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