

<http://blog.empas.com/leejaeyul5/>,  
<http://cafe.naver.com/leejaeyul.cafe>,  
<http://cafe.daum.net/leejaeyul5>

#### 4 Color Theorem proof of the regions on global surface

[1] 4 colors suffice for the distinguishing all regions about one region and the regions those share a common one region's boundary line. Here, one region can contain all shapes many regions.

[Proof] The reason is this. 3 colors suffice for the distinguishing all regions those share a common one region's boundary line.

[2] 3 colors suffice for the distinguishing all regions those share a common one region's boundary line.

[Proof] The reason is this. When there are lined from one region's inner one point to the points on one region's boundary line those are met the adjacent regions boundary lines, all extension regions are the regions those share one common point. 3 colors suffice for the distinguishing all regions those share one common point.

[3] 3 colors suffice for the distinguishing all regions those share one common point.

[Proof] The reason is this. When one region is selected, 2 colors suffice for the distinguishing all regions those share a common one selected region's boundary line.

#### Two each methods about FLT proof

$$X^n + Y^n = Z^n$$

$$A = Z - Y, B = Z - X$$

$$X = G(AB)^{1/n} + A, Y = G(AB)^{1/n} + B, Z = G(AB)^{1/n} + A + B, X + Y - Z = G(AB)^{1/n}$$

$$\{G(AB)^{1/n} + A\}^n + \{G(AB)^{1/n} + B\}^n = \{G(AB)^{1/n} + A + B\}^n$$

When  $n=1$ ,  $G=0$  and when  $n=2$ ,  $G=2^{1/2} > 0$  and when  $n=3$ ,  $G = \text{Function}(A, B) > 0$ .

$$X = (2AB)^{1/2} + A, Y = (2AB)^{1/2} + B, Z = (2AB)^{1/2} + A + B$$

$$2AB = k^2 \text{ (k is 1, 2, 3...)},$$

$$XY = k(k+A)(k+2A)/2A = k(k+B)(k+2B)/2B$$

All Pythagorean triples cannot be the power numbers.

#### 1st method about Fermat's Last Theorem proof

$$X^n + Y^n = Z^n$$

$$(X^{n/2})^2 + (Y^{n/2})^2 = (Z^{n/2})^2$$

$$a = Z^{n/2} - Y^{n/2}, b = Z^{n/2} - X^{n/2}$$

$$\{G(ab)^{1/2} + a\}^2 + \{G(ab)^{1/2} + b\}^2 = \{G(ab)^{1/2} + a + b\}^2$$

$$G = 2^{1/2} > 0, X^{n/2} = (2ab)^{1/2} + a, Y^{n/2} = (2ab)^{1/2} + b, Z^{n/2} = (2ab)^{1/2} + a + b$$

$$(XY)^n = ab \{2a^2 + 2b^2 + 13ab + 6(a+b)(2ab)^{1/2}\}$$

The numbers (X, Y, Z) need to be co-prime and the number (n) is the odd and prime number.

#### 2nd method about Fermat's Last Theorem proof

$$\{G(AB)^{1/n} + A\}^n + \{G(AB)^{1/n} + B\}^n = \{G(AB)^{1/n} + A + B\}^n$$

$$\text{When } A=B, 2\{G+A^{(n-2)/n}\}^n = \{G+2A^{(n-2)/n}\}^n$$

$$G = \{2^{(n-2)/n} + \dots + 2^{1/n} + 1\} \{2A^{(n-2)/n}\}^{1/n} = [\{2^{(n-2)/n} + \dots + 2^{1/n} + 1\}^n \{2A^{(n-2)}\}]^{1/n}$$

We make a numerical formula.  $\{2^{(n-2)/n} + \dots + 2^{1/n} + 1\} [\{2A^{(n-1)}B\}^{1/n} + \{2AB^{(n-1)}\}^{1/n}]$

$$q = 2G(AB)^{1/n} / \{2^{(n-2)/n} + \dots + 2^{1/n} + 1\} [\{2A^{(n-1)}B\}^{1/n} + \{2AB^{(n-1)}\}^{1/n}]$$

$$G(AB)^{1/n} = q \{2^{(n-2)/n} + \dots + 2^{1/n} + 1\} [\{2A^{(n-1)}B\}^{1/n} + \{2AB^{(n-1)}\}^{1/n}] / 2$$

when  $A=B$ ,  $q$  must be 1.

If the figure  $\{G(AB)^{1/n}\}$  can be the natural number in some natural numbers (A, B), the formula  $\{2G(AB)^{1/n}\}$  cannot have the figure  $\{2^{(n-2)/n} + \dots + 2^{1/n} + 1\}$ . But the numerical formula that we made  $\{2^{(n-2)/n} + \dots + 2^{1/n} + 1\} [\{2A^{(n-1)}B\}^{1/n} + \{2AB^{(n-1)}\}^{1/n}]$  have the figure  $\{2^{(n-2)/n} + \dots + 2^{1/n} + 1\}$ . And when  $A=B$ ,  $q = 2G(AB)^{1/n} / \{2^{(n-2)/n} + \dots + 2^{1/n} + 1\} (2^{1/n}A)$ . So, when  $A=B$ , the figure (q) cannot be 1. This is an apparent contradiction. Therefore, the figure  $\{G(AB)^{1/n}\}$  cannot be the natural number in the natural numbers (A, B).