Elementary proof of The Fermat's Last Theorem

(Complete Edition)

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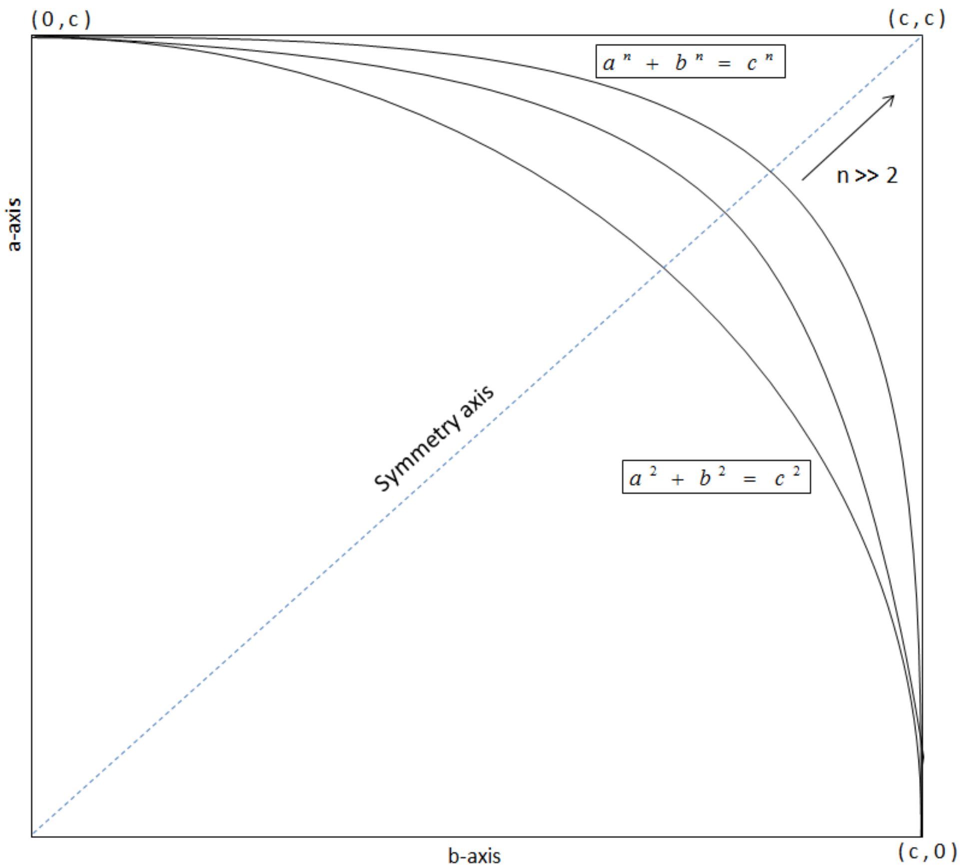
Fermat's Last Theorem (FLT) :

$a^n + b^n \neq c^n$, if $n > 2$ and a, b, c are the integers.

Prove ,

Draw the graph (Pic.1) as below, I consider only 1st quadrant.

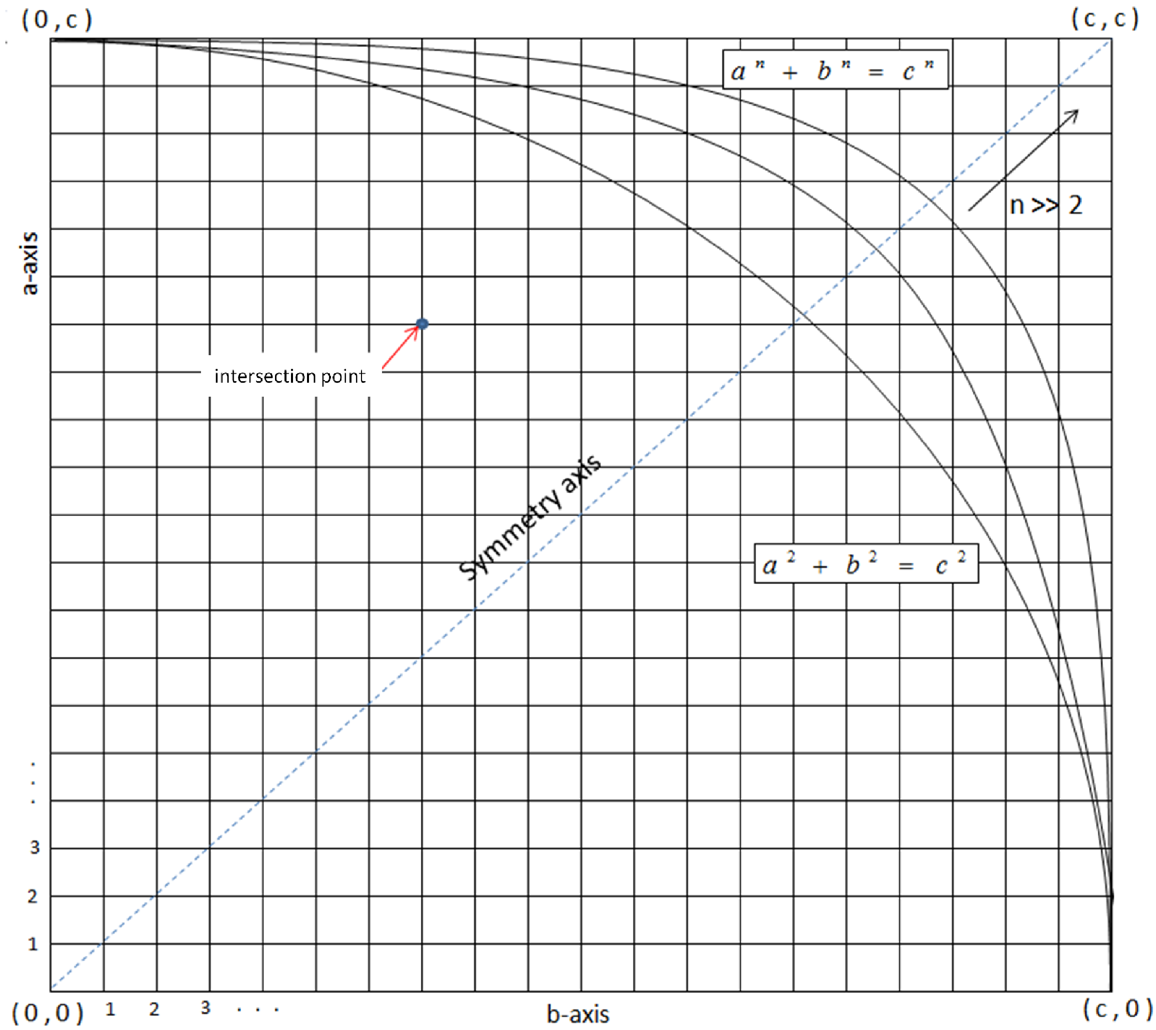
Pic .1



From Pic. 1 : if n is more , the curve will be near the point (c , c)

Then I make the grid (square 1 x 1) as below,

Pic. 2

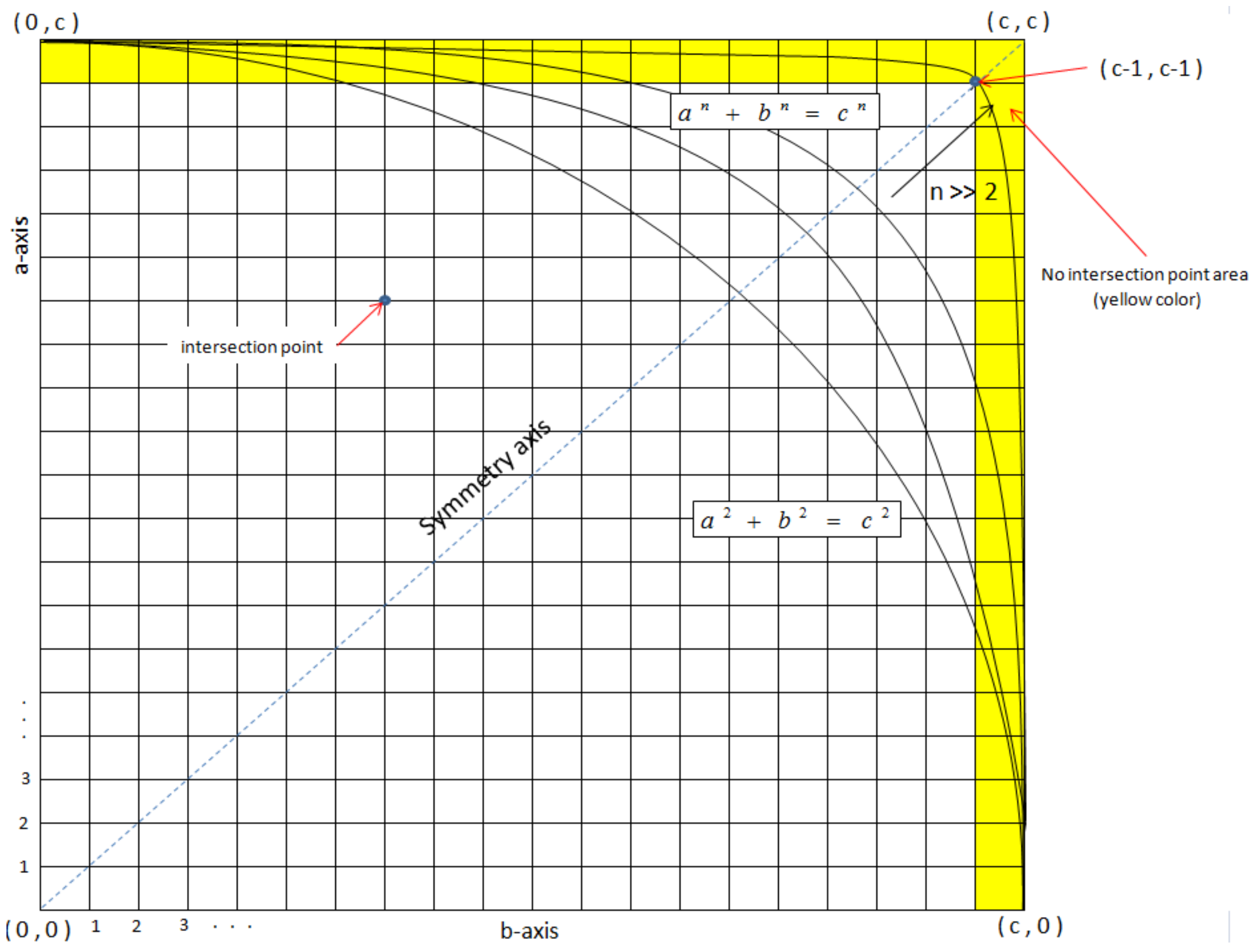


Now I can define the intersection point means the integers**,** and I will prove these curves will not pass the intersection point for $n > 2$.

No intersection point area

There are no intersection point area (yellow area) , all curves in this area follow FLT.

Pic. 3



Next , I will find the intersection point between the curves and the symmetry axis.

$$\sqrt[n]{c^n - b^n} = b$$

$$b = \frac{c}{\sqrt[n]{2}} \qquad \text{\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1)}$$

From (1) , b can't be the integer, the curves will not pass the symmetry axis at intersection point.

From the Pic. 3, I will find the relation between b and c at the point (c-1 , c-1),

$$\frac{c}{\sqrt[n]{2}} = c - 1$$

$$n = \frac{\ln(2)}{\ln(\frac{c}{c-1})} \qquad \text{\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (2)}$$

From (2), in the no intersection point area, it can be determined

$$n > \frac{\ln(2)}{\ln(\frac{c}{c-1})} \qquad \text{\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(3)}$$

Next, consider the curves in the no intersection point area.

$a^n + b^n = c^n$, a and b are not the integers.

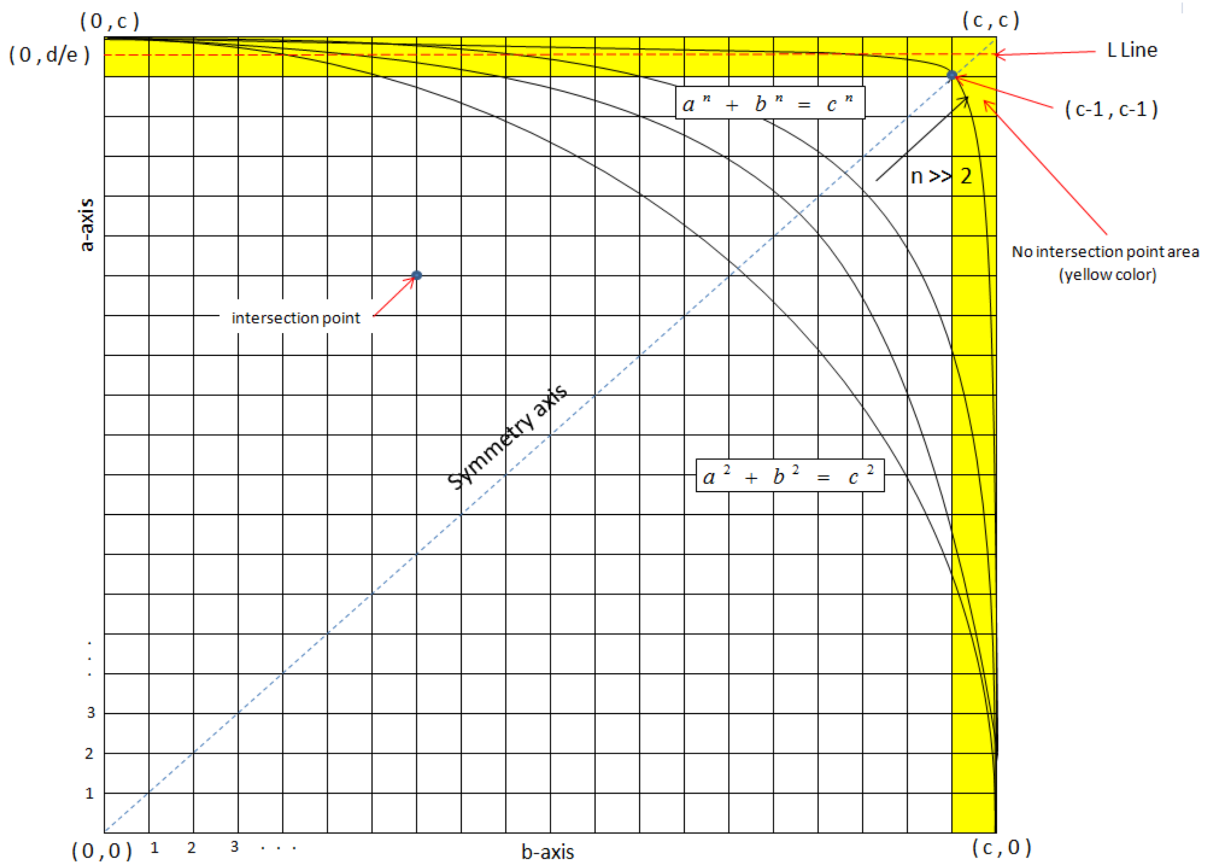
a and b may be the rational (fraction) or irrational numbers,

Assume a and b are the rational number, $a = \frac{d}{e}$ and $b = \frac{f}{e}$

(d , e) = 1 , (f , e) = 1 and d , e , f are the intergers.

$$(\frac{d}{e})^n + (\frac{f}{e})^n = c^n \qquad \text{\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(4)}$$

Pic. 4



See pic. 4, I draw the line (L line) in the no intersection point area.

The line will pass all the curves for all degree of n → ∞.

Assume L line pass a-axis at $\frac{d}{e}$, it can be written as below,

$$(\frac{d}{e})^{n_1} + (\frac{f_1}{e})^{n_1} = c^{n_1} \qquad \text{for } n = n_1$$

$$(\frac{d}{e})^{n_2} + (\frac{f_2}{e})^{n_2} = c^{n_2} \qquad \text{for } n = n_2$$

$$(\frac{d}{e})^{n_3} + (\frac{f_3}{e})^{n_3} = c^{n_3} \qquad \text{for } n = n_3$$

………………………………………………

$$(\frac{d}{e})^{n_\infty} + (\frac{f_\infty}{e})^{n_\infty} = c^{n_\infty} \qquad \text{for } n \to \infty$$

$f_1 < f_2 < f_3 < \ldots < f_\infty$ and $n_1 < n_2 < n_3 < \ldots < n_\infty$

Multiply the e^n all of the equation,

d^{n_1} + $f_1^{n_1}$ = $(ce)^n{}_1$ for n = n_1

d^{n_2} + $f_2^{n_2}$ = $(ce)^{n_2}$ for n = n_2

d^{n_3} + $f_3^{n_3}$ = $(ce)^{n_3}$ for n = n_3

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d^{n_∞} + $f_\infty^{n_\infty}$ = $(ce)^{n_\infty}$ for n → ∞

All equations show it can be written in $a^n + b^n = c^n$ by a, b, c can be the intergers.

But it is conflict with (3), if n > $\dfrac{\ln(2)}{\ln(\dfrac{ce}{ce-1})}$ the curves will not pass the intersection point.

it can't be written in the form $a^n + b^n = c^n$ for n → ∞

So I can judge a and b aren't the rational numbers. But they are the irrational numbers in the no intersection point area.

$a^n + b^n = c^n$, a and b are the irrational numbers in the no intersection point area.

Next, I will prove the FLT ,

$a^n + b^n \neq c^n$, if $n > 2$ and a, b, c are the integers.

Assume there is a equation $a^n + b^n = c^n$ and a, b, c, n are the integers.

Divided k^n into equation $(\frac{a}{k})^n + (\frac{b}{k})^n = (\frac{c}{k})^n$, k is a integer ________________ (5)

Then let k to n > $\dfrac{\ln(2)}{\ln(\dfrac{c/k}{(c/k)-1})}$, the curve will be in the no intersection point area.

$\dfrac{c}{k}$ may be integer or fraction.

Assume case#1) $\dfrac{c}{k}$ is a integer , let $\dfrac{c}{k}$ = m

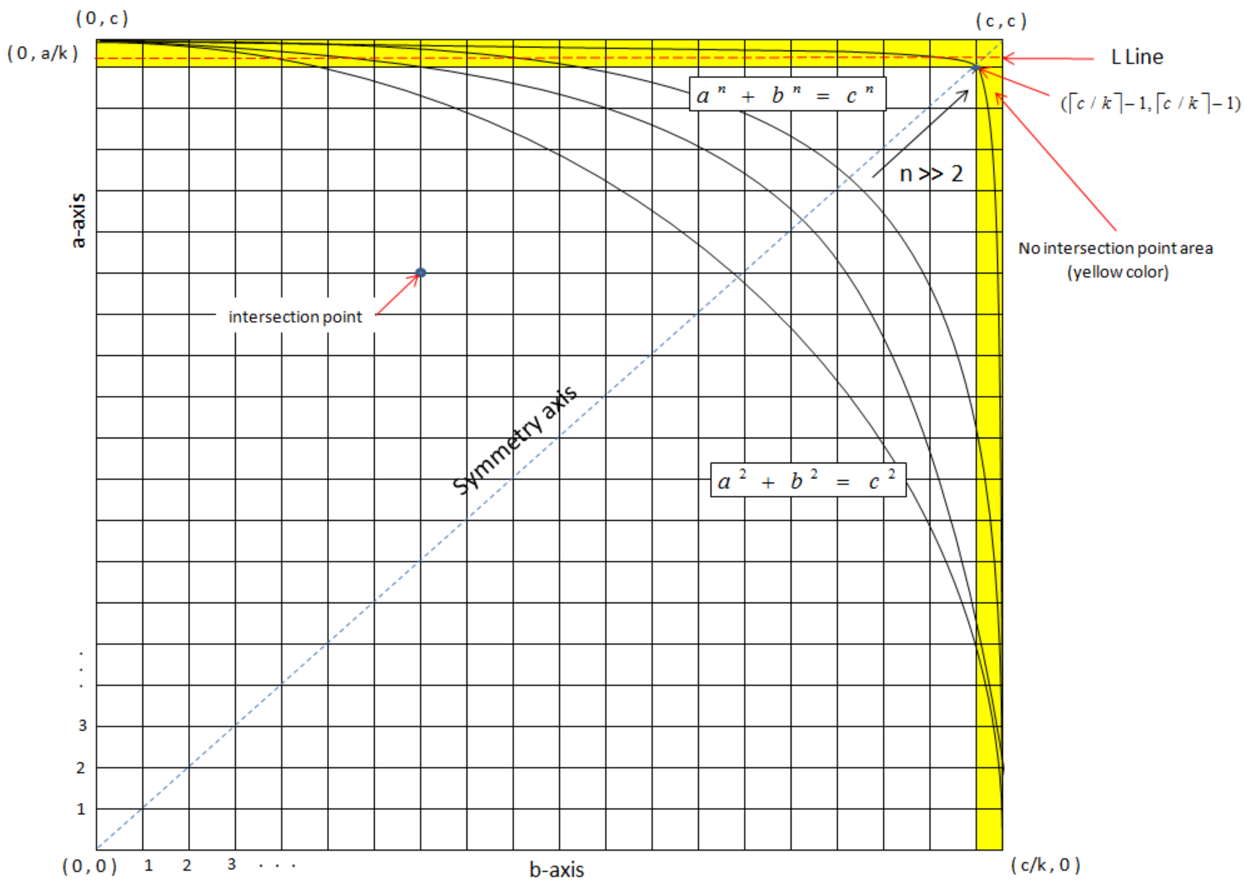
From (5) , $(\frac{a}{k})^n + (\frac{b}{k})^n = (m)^n$ ________________ (6)

From (6) , the equation is wrong, because it is conflict with the no intersection point area.

$\dfrac{a}{k}$ and $\dfrac{b}{k}$ mustn't be the rational numbers, **so the assumption case#1 is wrong.**

Assume case#2) $\dfrac{c}{k}$ is fraction. I can apply the plotting graph method as below

Pic. 5



From Pic. 5, If n > $\dfrac{\ln(2)}{\ln(\dfrac{c/k}{\lceil c/k \rceil - 1})}$, the curve will be in the no intersection point area.

From (5) , I will prove $\dfrac{a}{k}$ and $\dfrac{b}{k}$ mustn't be the rational numbers for $\dfrac{c}{k}$ too.

I draw the line (L line) in the no intersection point area. The line will pass all the curves for all degree of n → ∞.

Assume L line pass a-axis at $\dfrac{a}{k}$, it can be written as below,

$(\dfrac{a}{k})^{n_1} + (\dfrac{b_1}{k})^{n_1} = (\dfrac{c}{k})^{n_1}$ for n = n_1

$(\dfrac{a}{k})^{n_2} + (\dfrac{b_2}{k})^{n_2} = (\dfrac{c}{k})^{n_1}$ for n = n_2

$(\dfrac{a}{k})^{n_3} + (\dfrac{b_3}{k})^{n_3} = (\dfrac{c}{k})^{n_3}$ for n = n_3

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$(\dfrac{a}{k})^{n_\infty} + (\dfrac{b_\infty}{k})^{n_\infty} = (\dfrac{c}{k})^{n_\infty}$ for n → ∞

$b_1 < b_2 < b_3 < \ldots < b_\infty$ and $n_1 < n_2 < n_3 < \ldots < n_\infty$

Multiply the k^n all of the equation,

$a^{n_1} + b_1^{\ n_1} = c^{n}{}_{1}$ for n = n_1

$a^{n_2} + b_2^{\ n_2} = c^{n_2}$ for n = n_2

$a^{n_3} + b_3^{\ n_3} = c^{n_3}$ for n = n_3

………………………………………………

$a^{n_\infty} + b_\infty^{\ n_\infty} = c^{n_\infty}$ for n → ∞

All equations show it can be written in $a^n + b^n = c^n$ by a, b, c can be the intergers.

But it is conflict with (3), if n > $\frac{\ln(2)}{\ln(\frac{c}{c-1})}$ the curves will not pass the intersection point.

it can't be written in the form $a^n + b^n = c^n$ for n → ∞

So I can judge $\frac{a}{k}$ and $\frac{b}{k}$ aren't the rational numbers. But they are the irrational numbers in the no intersection point area. **so the assumption case#2 is wrong.**

From proof of case#1 and case#2 , I can say….

No any integer a , b , c for $a^n + b^n = c^n$ if n > 2

The Fermat's last Theorem is proved completely !!!
