An attempted Simple Proof Fermat's Last Theorem

Geon Cho
e-mail : edkjd@naver.com

Abstract: This paper attempts a simple proof for the Fermat's Last Theorem.

1.The fermat's last theorem

$a^n+b^n \neq c^n$
(a, b, c, n is natural number)
(a, b, c>0)(n>2)

2.Simple proof

1)
$y^n-x^n=(x+1)^n+(x+2)^n...+y^n-x^n-(x+1)^n...-(y-1)^n$
(y>x)
$=(x+1)^n+((x+1)+1)^n...+((y-1)+1)^n-x^n-(x+1)^n...-(y-1)^n$
$=(x^n+nx^{(n-1)}...+1^n)+((x+1)^n+n(x+1)^{(n-1)}...+1^n)...+((y-1)^n+n(y-1)^n+...+1^n)$
$-x^n-(x+1)^n...-(y-1)^n$
$=(nx^{(n-1)}...+1^n)+(n(x+1)^{(n-1)}...+1^n)...+(n(y-1)^n+...+1^n)$

so,

$y^2-x^2=y-x+2(x+(x+1)...+(y-1))$
$y^3-x^3=y-x+3(x+(x+1)...+(y-1))+3(x^2+(x+1)^{2...}+(y-1)^2)$
$y^4-x^4=y-x+4(x+(x+1)...+(y-1))+6(x^2+(x+1)^{2...}+(y-1)^2)+4(x^3+(x+1)^{3...}+(y-1)^3)$

...

(The equation terms are pascals triangular numbers)

2)
$c^n-b^n-a^n=(c^n-b^n)-(a^n-0^n)$

$=(n((c-1)^{(n-1)}...+b^{(n-1)})+...+(c-b))$
$-(n((a-1)^{(n-1)}...+0^{(n-1)})+...+(a-0))$ by 1)

If $c^n-b^n-a^n=0$ then

$(n((c-1)^{(n-1)}...+b^{(n-1)})+...+(c-b))-(n((a-1)^{(n-1)}...+0^{(n-1)})+...+(a-0))=0$

$n((c-1)^{(n-1)}...+b^{(n-1)})-n((a-1)^{(n-1)}...+0^{(n-1)})$
$...+n((c-1)...+b)-n((a-1)...+0)$
$=b+a-c$

3)
when m is large number,
$n(((mc-1)^{(n-1)}...+(mb)^{(n-1)})-((ma-1)^{(n-1)}...+0^{(n-1)}))$
$>\frac{n(n-1)}{2}(((mc-1)^{(n-2)}...+(mb)^{(n-2)})-((ma-1)^{(n-2)}...+0^{(n-2)}))...$
$>n(((mc-1)...+mb)-((ma-1)...+0))$
is established.

4)
If $c^n=b^n+a^n$ then $(mc)^n=(mb)^n+(ma)^n$

so,

$mb+ma-mc$
$=n((mc-1)^{(n-1)}...+(mb)^{(n-1)})-n((ma-1)^{(n-1)}...+0^{(n-1)})$
$...+n((mc-1)...+mb)-n((ma-1)...+0)$

if n=2 then
$mb+ma-mc=n((mc-1)...+mb)-n((ma-1)...+0)$
$mb+ma-mc=n(\frac{(mc-1)mc}{2}-\frac{(mb-1)mb}{2}-\frac{(ma-1)ma}{2})$
and, if $b^2+a^2-c^2=0$ then $mb+ma-mc$ = $\frac{n}{2}(-mc+mb+ma)$

if n>2 then
$mb+ma-mc=n((mc-1)^{(n-1)}...+(mb)^{(n-1)})-n((ma-1)^{(n-1)}...+0^{(n-1)})$
$...+n((mc-1)...+mb)-n((ma-1)...+0)$(expression 1)

$mb+ma-mc=n((mc-1)^{(n-1)}...+(mb)^{(n-1)})-n((ma-1)^{(n-1)}...+0^{(n-1)})$
$...+n(\frac{(mc-1)mc}{2}-\frac{(mb-1)mb}{2}-\frac{(ma-1)ma}{2})$

and, if $(mb)^n+(ma)^n-(mc)^n=0$ then $(mb)^2+(ma)^2-(mc)^2\neq 0\rightarrow$ $mb+ma-mc$ = (rest)+ $\frac{n}{2}(((mc)^2-mc)-((mb)^2-mb)-((ma)^2-ma))\neq(rest)+\frac{n}{2}(-mc+mb+ma)$
and, because of $(mb)^2+(ma)^2-(mc)^2\neq 0$, If m is large number then $mb+ma-mc$ << $\frac{n}{2}(((mc)^2-mc)-((mb)^2-mb)-((ma)^2-ma))$
and, $mb+ma-mc$ << (rest)+$\frac{n}{2}(((mc)^2-mc)-((mb)^2-mb)-((ma)^2-ma))$ by 3)
So, expression 1 is contradict. So, $(mc)^n\neq(mb)^n+(ma)^n$ and $c^n\neq b^n+a^n$