CHAPTER 5

APPLIED PHYSICS V

CALCULATE THE Nº "PI" (π):

It is defined as the ratio between the length of the circle and its diameter:

$$\left.\begin{array}{l}\text{Diameter}= 2.r \\ \text{Length} = 2.\ \pi.r\end{array}\right\} \quad \text{is a ctnt. relationship.}$$

The relationship between the area of the square and the circle is:

Area circle = $\pi.r^2 = \pi.(\text{diameter}/2)^2$.

Then the area of the square: side$\times$side, or put another way, the side is similar to the diameter of the circle decreased by 1 / 9 (Ie 8 / 9 of it).

Then:

Area circle = $\pi.r^2 \approx (8/9.\text{diàmetre})^2 = (64/81).(4.r^2) \Rightarrow \pi= 256/81$.

There are other ways to calculate the number pi based on the extent of mathematical functions which lists below.

It has been shown that the written representation of a function f(x) such as Sinx, Cosx, e^x… can be defined as the sum of polynomial terms, for example:

$P(x)= C_0+ C_1(x-a)+ C_2(x-a)^2 +... + C_n(x-a)^n$.

The derivatives used for more accurate results and integrate the polynomial as follows:

$f'(x)= C_1+ 2.C_2(x-a)+ 3.C_3(x-a)^2 +\ldots+ n.C_n(x-a)^{n-1}$

$f''(x)= 2.C_2+ 3.2.C_3(x-a)+ 4.3.C_4(x-a)^2 +\ldots+ n.(n-1).C_n(x-a)^{n-2}$

$f^n(x)=n.(n-1).(n-2)...2.1.C_n$.
at the same time:

$f(a)= C_0$, $f'(a)= C_1$, $f''(a)= 2.1.C_2$, $f'''(a)= 3.2.1.C_3\ldots$

$f^{n}(a)= n.(n-1).(n-2)...2.1.C_n$.

Taylor's formula is valid:

$f(x)= f(a)+ [(x-a)/1].f'(a)+ [(x-a)^2/1.2].f''(a)+[(x-a)^3 /1.2.3].f'''(a)+...+[(x-a)^n /n!].f^n(a)+ R_n(x)$.

Over the interval around x = a, and assuming that f (x) has infinite order in derivatives environment, suppose n very large, then the limit of R_n (x) $\rightarrow$ 0 as n $\rightarrow \infty$. Therefore, in the range "a-R" and "a+R" function is developable in *Taylor series.*

And for x = 0 we have a case called *McLaurin series.*

a)Newton : $\text{ArcSin}x= x+ (1/2) (x^3 /3)+ (1/2).(3/4).(x^5 /5)+$

And if x = ½, then ArcSin(1/2)= π /6.

b) Leibnitz: $\sum_{n=0}^{\infty}(-1)^n /(2n+1)$ =1- 1/3+ 1/5- 1/7+ 1/9...= π/4.

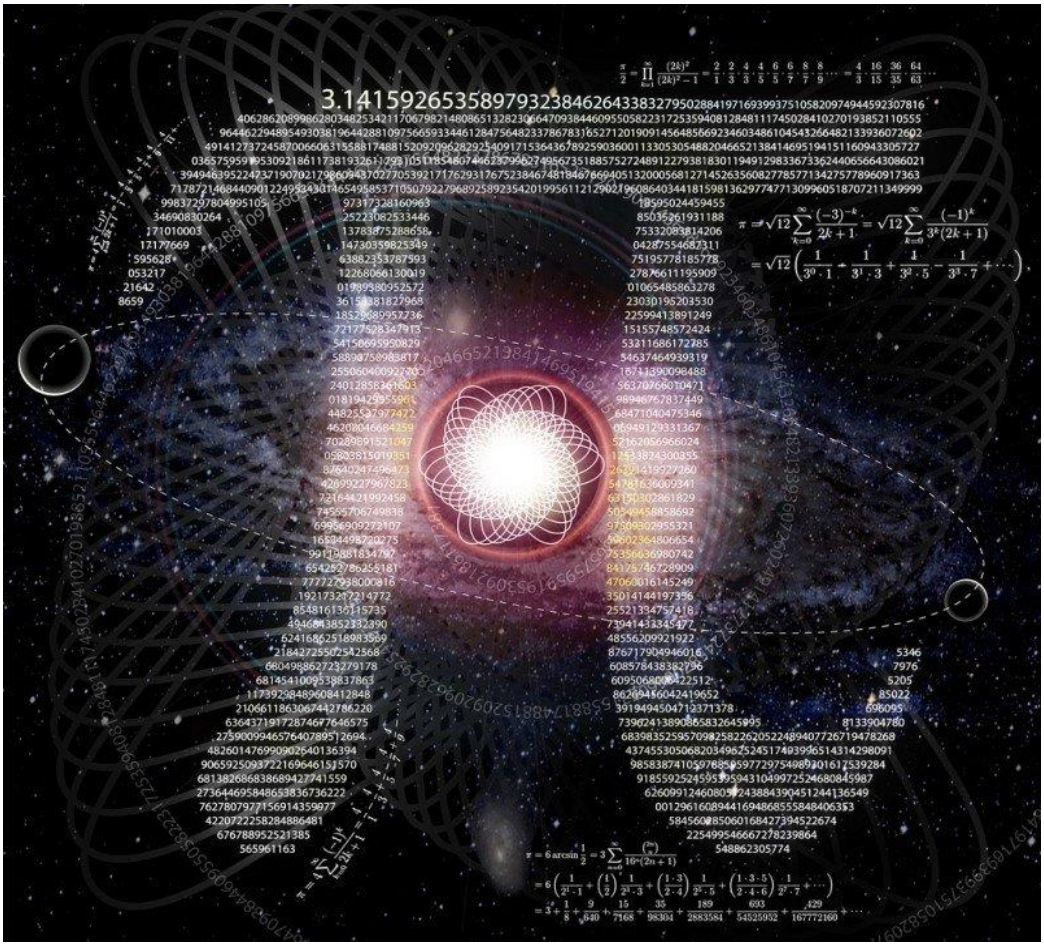
c) Gregory : $\text{ArcTg}x= x- x^3 /3+ x^5 /5- x^7 /7+ x^9 /9\ldots$

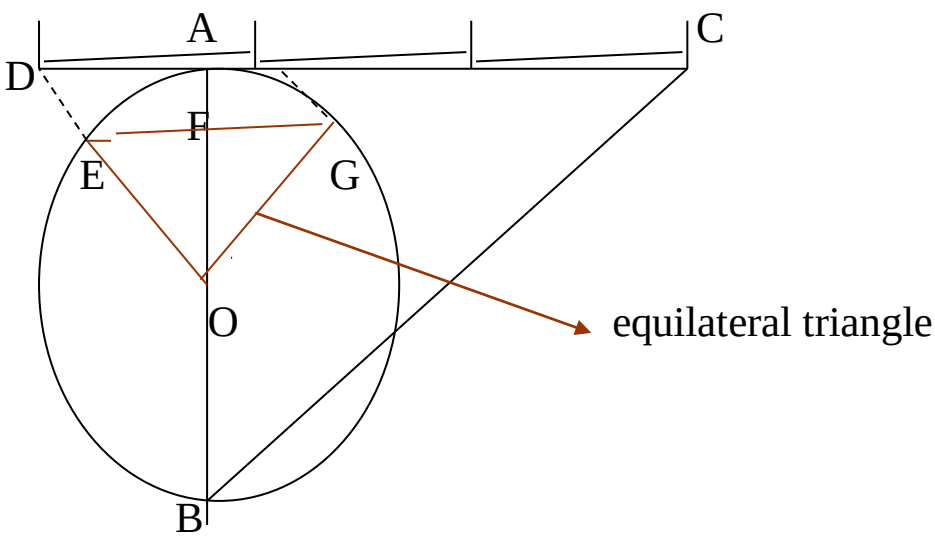
and if x= $1/\sqrt{3}$ Then: Arctg ($1 /\sqrt{3}$)= π/6.

Knowing that 180 degrees equals π radiants.

d) Euler's formula: $e^{i\varphi} = Cos\varphi + iSin\varphi$.

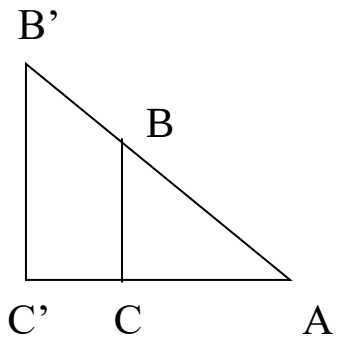
e) Method of Kochanski:





$(BC)^2 = (AB)^2 + (3-DA)^2$ on BC≈longitud/2

supposing the radii is “a” and:



and BC/AC= B'C'/ AC'

Kochanski's method, first calculated OF: $(OG)^2 = (FG)^2 + (OF)^2$

$a^2 = (a/2)^2 + (OF)^2 \rightarrow OF = \sqrt{3}/2.$

Then DA: EF / DA = OF / OR $\rightarrow$ DA $= \left[(1/2)/(\sqrt{3/2})\right] .a^{2.}$

Finally, assuming a = 1, $(BC)^2 = (\pi.a)^2$, which gives π=3'14153...

DEFINING Supersymmetry:

It can be seen as the highest accuracy (or symmetry) can be achieved between the particles (as submitted to the weak interactions as strong) so that

for example the responsible of atomic attraction between protons in the core

the responsible that unstable particles and atomic nuclei will change. There are short, so more superficial.

there are factors left away, so everything is unambiguous.

One ordered universe ≡ *supersymmetry* (obviously referring to elementary particles).

Why we can never achieve absolutely everything? Example: the order absolute or Δ S ↓↓

(Or T = -273 ° C). It's like all those who lost everything they want.

Patience is the mother of science; we can not exceed the line between too much patience and calm and the novelty or the record in which we jumped fast things // something is "uploaded" into the world of ideas and concepts.

For most, science and astronomy are trifles, this is depressing because it influences the mind of which we have chosen to science. Being intangible it will never be materialist.