Regarding chaos:

In the pursuit of this one work I must admit that one year sabbatical runs a little overboard, although it never leaves to learn something that can then be useful to you in the future ; for example : if I look at the negative side of the chemical discipline (waste industrial , both plastic and central muclears , or detergents ...) I would never wear hands on work or would never do anything (I mean that no one is never free from guilt and everyone has done it , at some point moment in their life, some mischief or questionable things).

The treatment we will do in this chapter is about the representation and expression we will make of chaos.
In this context , statistics can to understand each other as full space or space empty , or, as a philosopher said , everything is immersed within " the ether " and this concept has as its beginning the following equation:
$P_{n+1}(x) = U.\, P_n(x)$ where U is the **Perron-Frobenius operator .**

And, even though it looks like I 've taken a hallucinogenic drug , I see very clearly .

Classical Physics is deterministic and reversible, while quantum is based on **probability** irreversibility and events . As it grows the events , chaos generates the previous equation .

As in the case of the equation Schrödinger's equation , the probability in space of finding or deciphering x increases as n increases, and varies between 0 and 1 (this takes us to work with the following statistical formula: $P^2(x) = P^*(x).\, P(x)$

The resolution we use now is the **statistic** , that is to say , that of a set of trajectories that end in a probabilistic description or, in other words , of one another way, to situate **chaos theory** in statistical terms , that is probability of realizing a value x in a time t.

It can be understood that $P_{n+1}(x) \approx P_n(x)$ when $n \to \infty$.

The resolution we use now is statistics **,** that is , a set of trajectories that end in a probabilistic description or so **-** called of one In other words, placing **chaos** theory in statistical terms **,** what is likely to happen to a value “x” at time “t”.

Now we will compare the integral $\int \psi . \psi^* .dx = 1$ from mechanics quantum with

$$P(x)=\int_{-\infty}^{\infty} P_n(x).P_n(y).dx$$

which is a "modern" expression

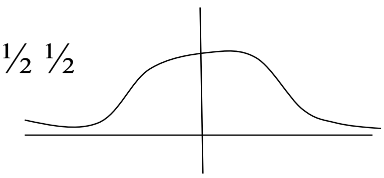
comparable to $\psi = N.\varphi_A + N.\varphi_B = P_n(x)$

and $\psi^* = N^*.\varphi_A - N^*.\varphi_B = P_n(y) = P_n^*(x)$

Where $P_n(x) \equiv \delta(x - f(x_0))$

To see something completely finished is impossible , then I will deal with a facet of Chemistry-Physics which is recently , with the intention to expand more the sights of this discipline saying that also replace $\delta(y - x_0)$ by $P_n(y)$.

½ ½



-yxy

$$\int_{-\infty}^{\infty} P_n(x).P_n(y).dx = N_A^* N_A + N_B^* N_B = 1$$

Depending on the SYSTEM in which we are (I I refer to the function that describes it) we will have one result or another ; for example **(1)** :

$x_{n+1} = 2x_n$ when $0 < x < ½$
$x_{n+1} = 2x_n + 1$ when $½ \leq x < 1$

f(x_0)= 2x and y=2x+1 where everything folded are the conditions initials .

Seeing that we have 2 unknowns "x" and "y", assimilability x_n and x_{n+1}

then : $P_{n+1}(x) = ½[P_n(x/2). P_n(y) + P_n((x+1)/2). P_n(y)]$,
This equation comes from to integrate each of the two terms as follows :

δ(x- f(x_0)) ≡x- 2x , then :

$$\int_0^{0,5} (x - 2x).P_n.(y).dy = -x/2$$

while the second term :

δ(x- f(x_0)) ≡x-(2x+1), then :

$\int_{0,5}^{1} [x - (2x + 1)]$dy =(-x-1).y $]_{0,5}^{1}$=(-x-1)- (-x-1)/2 =
= (-x-1) ½.

and ½ of each variable of P_n, ($P_n(x)$)

is divided by 2 since it represents the normalization factor .

$$P_{n+1}(x) = ½ [P_n(x/2) + P_n((x+1)/2)]$$

When we set the product [(-x/2)].[-(x+ 1)/ 2] equal to 0, us gives x= 0 and x= 1 **This value would be comparable to that of the probability ;**

While in another case we have of one equation of motion with more of one variable (x and y) **(2)** :

$$(x, y) \rightarrow \begin{cases} (2x, ½) \text{ when } 0 \leq x \leq 1/2 \\ (2x-1, (y+1)/2) \text{ when } ½ < x \leq 1 \end{cases}$$

then the chaos equation is :

$$U.\, P(x, y) = [P(x/2, 2y)\, \Theta(1/2 - y)] + [P((x+1)/2, 2y-1)\, \Theta(y - ½)].$$

The fact to isolate P(x, y) from Θ(y) has to do with with the coordinates we use ; the operator Hamiltonian can be represented in Cartesian or polar coordinates , and also has an expression “ where the terms Φand Θare separated ”.

Life has given me transformed into a 35 year old man with the past broken and aware that I do nothing by thinking about it. The effort to think creatively is empowering me, even though the moments of lucidity they happen every time more isolated from each other; let's remember Eckhart Tolle and his “Power of Now”.

The expressions 2y and 2y-1 coming from the 1st term $P_n(x, y)$:

i) in (x, y') knowing that y'=1/2, $x_{n+1} = y'\, 2x_n \rightarrow y' = 2y$

ii) which explains 2y- 1, which belongs to

P(x ,y)

$y' = (y+1)/2 \qquad x_{n+1} = 2x_n - 1$

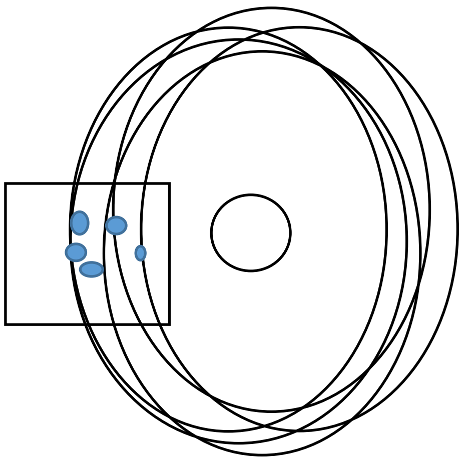
$x_n = (x_{n+1} + 1)/2$

where $\Theta(y)$ has the same function that $P_n(y)$ in example **(1)**

moreover , since $P_n(x, y)$ is considered bidependent , it is not equal to zero (to check that the probability is 1), therefore if it you want , you need values defined preceded by “y” to announce that everyone The cases have certain conditions (that is , each problem uses certain premises).

For example , unlike what Newton postulated , in a single system , this always has never happens for same path (is chaos: the number of orbits that pass through space); what we do is to get closer to the result more close to the real thing ...

sun



Areas where the plate is recorded. Orbits in years successive (also in 3-D!!)

Another system may be the reaction A B →; when equilibrium is reached A B ↔there is always some fluctuation that “dislocates” the mass from A to B and varies slightly .

Even I describe another case: in the same way that the lines spectral lines are divided, too the rabbit population does it and the headquarters predators in what is called a variant of the logistic equation (Lotka-Volterra).

While , analyzing the terms in red (highlighted with arrows):

$$U.P_n(x, y)= [P(x/2, 2y)\Theta(1/2- y)]+ [P((x+ 1)/ 2, 2y-1)\Theta(y- ½)]$$

$(1/2-y). (y- ½) \rightarrow y/2- ¼- y^2 + ½= -y^2 + y- ¼=0$

and using the solution of the second- order equations degree :

$y= [-b +/- \sqrt{b^2 - 4ac}] / 2a$ being $ay^2 + by+ c= 0$

we obtain $y= ½+ 1/ \sqrt{2}$ and $y= 1/2+- 1/ \sqrt{2}$ which add up to 1 (♣)

(total probability)

And now we we will start to deduce how find the variables within each Θ:

1. if we assume that " $\delta(f(y)- y)$" is the term that will give the expression that should Θgo inside we will see that f (y)= ½ to obtain ½- y.
2. While y-1/2 comes from (2y- 1)/2 $\rightarrow$y- f(y).

So $\delta(f(y)- y)$ as $\delta(y- f(y))$ have the particularity that the multiplication of the two gives 1. What is similar more to the variable inside Θ is [y-((y+1)/2)], and gives (y-1)/2.
<u>Such a resolution comes to mind that this Probability thesis 1 is not entirely accurate but It's getting closer and that's where I've come , at least for now </u>.

How we have I have seen that the sum of the 2 solutions coming from the equation of 2 where degree must be 1.

Then if we calculate the probability of the situation next (result of working with the second equation of motion , the one that refers to (x, y)):

(y- f(y)) $\rightarrow$y- [(y+ 1)/2] $\rightarrow$(1- y)/2

(f(y)- y) $\rightarrow$[(y+ 1)/2]- y $\rightarrow$(y- 1)/2 *probability total*
(1- y). (y- 1)= 0 its resolution gives y= 1. (♠)

The sum of the 2 expressions subtracted from $\delta(f(y)- y)$ and $\delta(y- f(y))$,
(♣) and (♠), can explain the overall statistic or probability .

I have the same feeling that, when I was studying and had just taken an exam , once outside was thinking about how had answered the questions and what was there put on and stopped putting on; now it happens to me too with the achievement of this one book

To understand more good these calculations we will look others equations or functions of systems that are not fractional **(3)** :

$P_n(x) = x^2 - x + 1/6$ if we understand them as $(f(x) - x)$ we can deduce that $f(x) = x^2 + 16$.

Then : $x^2 - x + 1/6 = 0$ and their result gives :

$$\left.\begin{array}{l} (1+\sqrt{1/3})/2 \\ (1-\sqrt{1/3})/2 \end{array}\right\} \rightarrow \text{the sum of which gives 1.}$$

(4) Another case is the one that says that $P_n(x) = x$ and $P_{n+1}(x) = \delta(x - f(x_0)) = ¼ + (x/2)$

knowing that $P_n(x) = x$ and at the same time $P_n(x) = \delta(x - f(x_0))$ we deduce that $¼ + x/2 = x$, or $¼ + x/2 - x = 0$; the $x_1 = ½$.

To do comply with the rule we say about $\Psi$the most down [where ($\Psi . \Psi^*$) is equivalent to probability], the reverse also exists :

$x - (1/4 + x/2)$. Its resolution when equal to 0 is $x_2 = ½$. And at add the 2 results (x_1 and x_2) $\rightarrow 1$: Overall probability .

The functions typical of Schrödinger's quantum mechanics they are $\Psi = N.(\varphi_A + \lambda\varphi_B)$

$\Psi^* = N^*.(\varphi_A - \lambda\varphi_B)$ where λ is the mixing coefficient .

<u>It is applicable to operators !!</u>

The Hamiltonian it's so classic how love grandchild , and it reminds me of mine grandmother , who died when I was studying 1st career ; in part him/her I dedicated the triumph to her because , during the nights student when it was n't yet located in Girona, at home it always reminded me when I was watching television with the question: "you have n't to study anything for tomorrow ?" (the good thing was that I him/her did quite a case).

AUFBAU principle :

$\Psi = a.\ \psi_1 + b.\ \psi_2 + c.\ \psi_3 + d.\ \psi_4 + \ldots$ which means that any complex function can be written from simple functions .

In the analysis of U we see that an operator referring to probability and acting on $P_n(x)$ and $P_{n+1}(x)$ ends confusing in the head from

$\rightarrow\ \infty$

events .

Bernouilli polynomials :

If we repeat the measurement process n times over the *Bernoulli polynomials* [$B_n(x)$], we obtain :

$$UB_n(x) = (1/2)^n B_n(x)$$

We know that the operator U is called the "Perron-Frobenius operator" or " *evolution operator* "; its analogy with the operator Hamiltonian is the following :

$$\psi(t) = e^{-i\,.\,H.\,(t-t_0)}\,.\,\psi(t_0) = U(t-t_0)\,.\,\psi(t_0)$$

where H is the eigenvalue and U the operator.
It is more , this equation relates the statistical terms of Perron - Frobenius to Schrödinger quantum mechanics .

Exists the appearance next :
$UP_n(x) = P_{n+1}(x)$ if $n \to \infty$ then $Ua = a$