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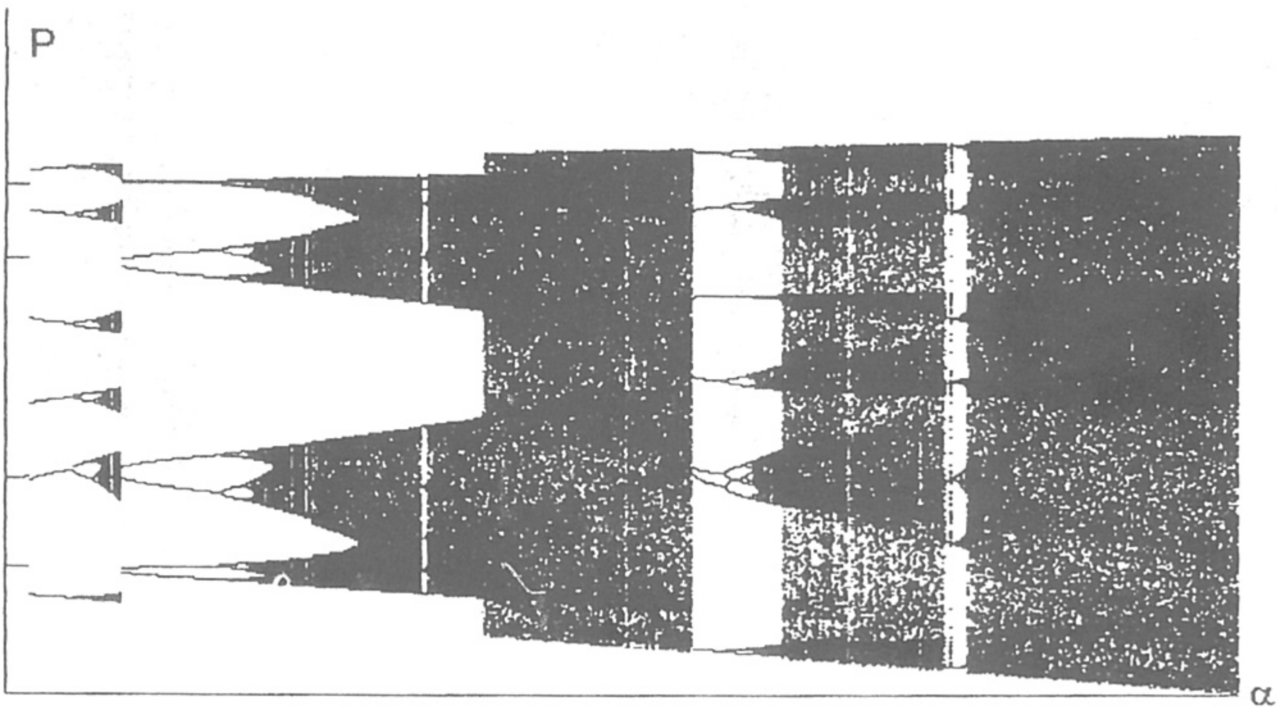

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Geometrical Model of Anticipatory Embedded Systems

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Abstract
I have defined (Garnier-Malet, 1997) the fundamental movement of doubling which transforms any initial system into anticipatory (Rosen, 1985) embedded (Dubois, 1996 and 1997) systems. I have demonstrated that six levels of embedding are necessary in the initial system which is the zero level during its transformation. Each level has its observer. With scalings of transformation's spaces and times, each level is a zero level. During the doubling transformation the initial observer cannot observe the other observers. But, at the end of the transformation which is always the beginning of another transformation, the initial and the third observers, then the third and the sixth observers, exchange their space's and time's perception.
These exchanges are the only way for the initial observer to know and anticipate the consequences of an experience of embedded systems before having time to realise it in the initial system and, above all, without modifying this initial space. The perception's exchange of the observers must be the consequences of this necessity at the end of the transformation. These exchanges imply three speeds of doubling which I have calculated. They are necessary at the end to juxtapose the six embedded levels in the initial system which must be necessarily one ten-dimensional space. We shall see that this implication is as fundamental as the movement of doubling.
Keywords : observers, perception, anticipation, scaling, dilation or expansion of spaces.

1. Introduction

An application to the solar system (Garnier-Malet, 1997) which is anticipatory embedded systems (I have found the mathematical link between six double planetary levels) has allowed me to calculate the speed of the doubling transformation. For the human observers who are in the third solar level, this constant speed is the speed of light C=299 792 km./s.
In this application, I have demonstrated that 24 840 years are the time of one cycle of the solar doubling transformation. Now, we are almost at the end of this doubling time. Only at this end, the third solar observers (who we are) can observe the space and time of the initial or the sixth observer. With the speed of light, two other speeds of doubling transformation give to the third observer three perceptions of the surrounding spaces when all the levels are juxtaposed.
Before explaining this three perceptions and their consequences in our Universe, I am going to remind you the fundamental movement of doubling.

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2. The Fundamental Movement of Doubling

With scalings of spaces and times, the movement of doubling allows each level to make the same transformation but not in the same time. This movement is fundamental because it can be applied to a particle and to a space. This double application is the condition of observers' exchanges. In fact, a perceivable space of an embedded observer o_n is always a perceivable particle of an initial observer o_0. The value of n determines a limit of perception of a space for o_n and a limit of perception of a particle for o_0.

The initial observer o_0 is at the centre of a spherical space α_0 (radius $R_0=2^nR_n$). The surface of α_0 is the horizon of o_0. For o_0, the smallest perceivable particle on α_0 is a spherical space α_n (radius R_n). The initial movement of α_n on α_0 is observed by o_0 in a plane $P_0(x_0, y_0)$ which determines a circular horizon $2\pi R_0=\Omega_0$ on the sphere α_0 (fig. 1). P_0 is a privileged plane for o_0 which observes the initial movement of α_n in α_0.

Afterwards, I always characterise the spherical space α_n of o_n by the horizon Ω_n, $\forall$n.

With scalings of spaces and times, o_n is ($\forall$n) the initial observer of the particle Ω_{2n} in the space Ω_n.

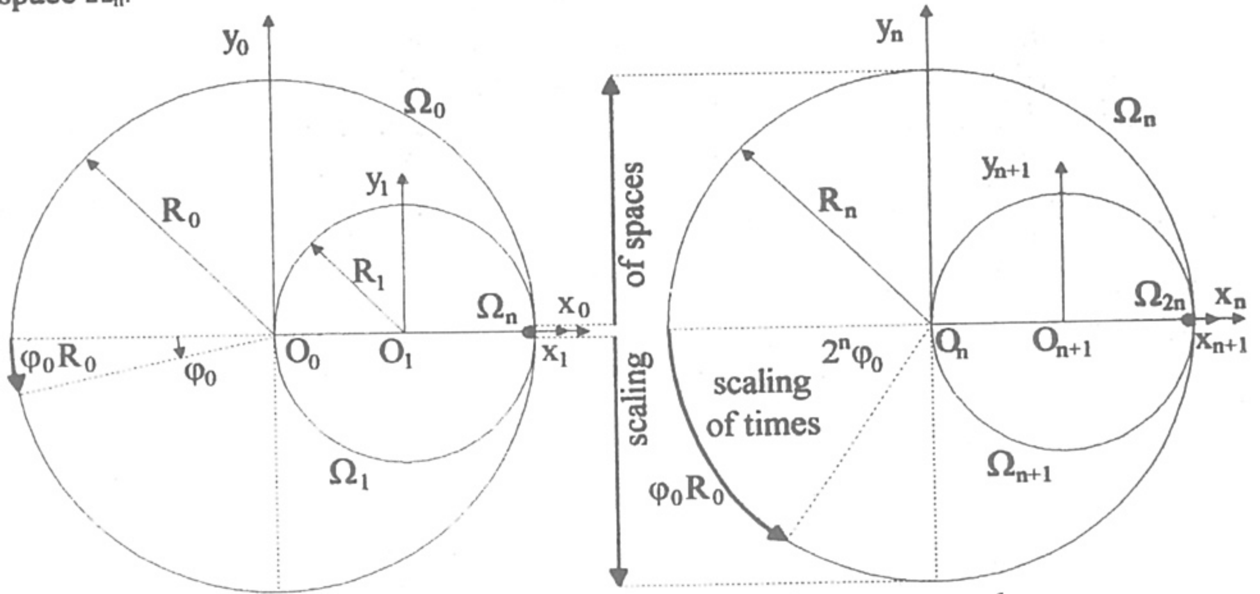

Figure 1 : scalings of spaces and times between o_0 and o_n.

2.1. Fusion and Fission of the Particle by Spinback

Initially, $P_0, P_1,\ldots, P_n$ are juxtaposed. $\Omega_0, \Omega_1,\ldots, \Omega_n$, are tangential in the same point. For o_0, this point is the perceivable particle Ω_n inside Ω_0. For o_n, $\Omega_0, \Omega_1,\ldots, \Omega_n$ are tangential in the point Ω_{2n} which is the smallest perceivable particle for o_n.

At the centre of Ω_0, o_0 observes the rotation φ_0 of $2\Omega_n$ on Ω_0 (fig. 2). The speed of this rotation is constant.

$\forall$n, at the centre of Ω_n, o_n observes the rotation $\varphi_n=\varphi_0/2^n$ of $2\Omega_{2n}$ on Ω_n.

During this rotation φ_0 of the radius R_0 (corresponding to $2\Omega_n$), the plane $P_1(x_1, y_1)$ makes a rotation φ_0 around this radius. The rotation π of $2\Omega_n$ on Ω_0 turns back P_1 in P_0 and reverses the movement of Ω_1 in Ω_0. I have called this movement the spinback of the space Ω_1 into Ω_0. The spinback of Ω_1 is a movement of fission and fusion of the particles Ω_n, Ω_{n+1},..., Ω_{2n}. It doesn't remake the initial state.

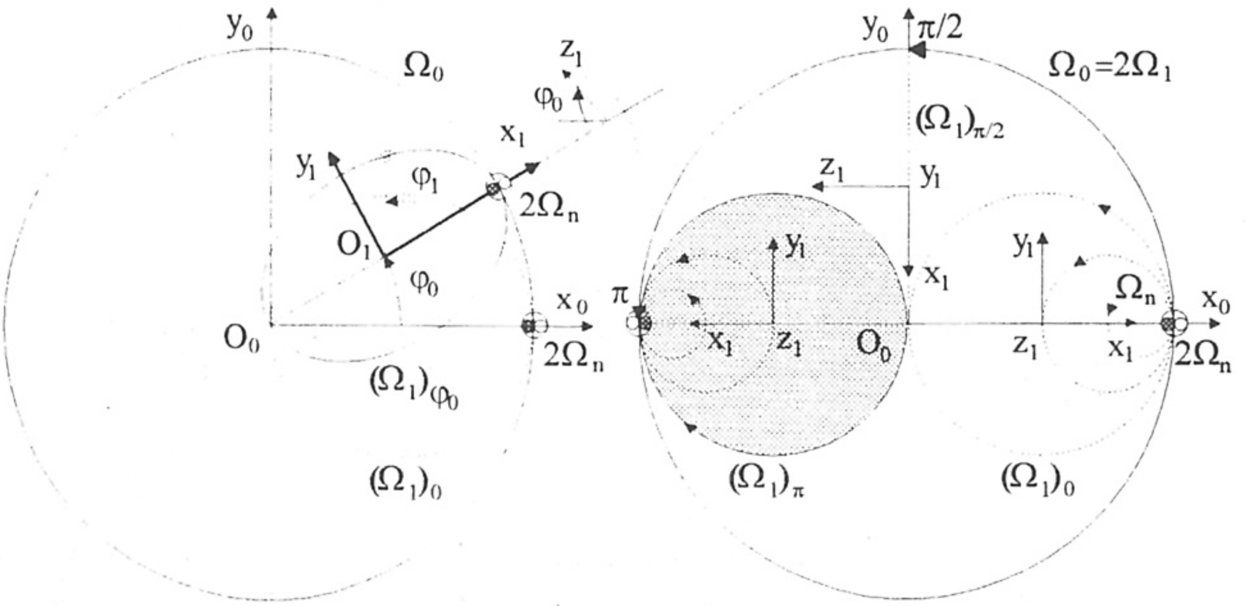

Figure 2 : the spinback.

The particles Ω_{n+1}, Ω_{n+2},..., Ω_{2n} have reversed their position into Ω_n which has reversed its movement into P_0. This movement which modifies the properties of the particle without modifying its envelope, can explain the spin of the particles and the spin of the spaces (that is to say the gravitation).

By definition, the spinback in the space Ω_n is 2^n faster than the spinback in the space Ω_0. So, o_n can observe 2^n times the transformation which is observed only once by o_0.

2.2. Negative Time and Imaginary Dilated Space

The initial observer can imagine a virtual observer o_{-1} in a virtual space Ω_{-1} (fig. 3) where the time of one spinback of Ω_{-1} is the time of two spinbacks of Ω_0.

This observer o_{-1} can perceive the outside of Ω_0 in $2\Omega_O$ and the particle $2\Omega_n$ but not the particle Ω_n. For o_{-1}, the time of the no perceivable spinback of Ω_n into $2\Omega_n$ is the time of the rotation π of $2\Omega_n$ on Ω_0. For o_{-1}, it is a negative time of a virtual rotation $\varphi_1=\varphi_0/2=\pi/2$ of Ω_0 in this virtual space.

For o_0, this virtual initial dilated space $\Omega_{-1}=2\Omega_O$ seems to be the consequence of a virtual path of Ω_O in this space, during the rotation $\varphi_{-1}=\pi/2$ which transforms (in a negative time) a negative imaginary space $-i\Omega_{-1}$ into a real space $(i)\times -i\Omega_{-1}=\Omega_{-1}$.

The complex number i (with $i^2=-1$) can be the operator of this rotation and this dilation. It corresponds to the rotation $\pi/2$ of the particle ($R_0e^{i\varphi_0}$) in the plane and to the rotation $\pi/2$ of the plane of Ω_0 in the space. It is logical because, by definition, the horizon Ω_0 of the initial observer is also the horizon of a particle for another observer.
For o_0, the virtual observer o_{-1} is at the centre of the particle $2\Omega_n$.

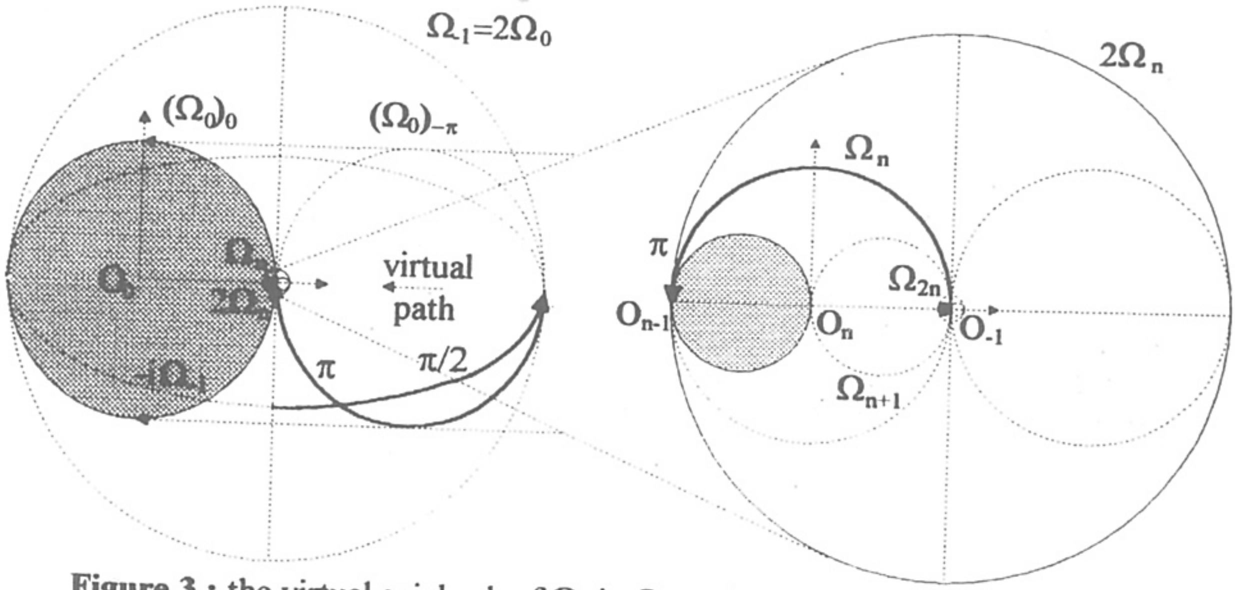

Figure 3 : the virtual spinback of Ω_0 in Ω_{-1} and the real spinback in Ω_{n+1} in Ω_n.

The spinback of Ω_{n+1} in Ω_n (no perceivable by o_0) is faster ($\times 2^n$) than the spinback of Ω_1 in Ω_0. It allows o_{-1} and o_n to exchange their place twice. If the particle Ω_n can dilate its space and can become $2^n\Omega_n$ during the spinback of $2\Omega_n$ on Ω_0, Ω_0 and $2^n\Omega_n=\Omega_0$ can be juxtaposed. So, o_0 and o_n can exchange their place : o_0 becomes o_n when o_n becomes o_{-1}. Then, o_n becomes o_0 again when o_{-1} becomes o_n. These exchanges which can continue between o_n and o_{2n} use two kinds of particles' paths. The observers' exchanges are also paths' exchanges during the juxtaposition of Ω_0 and the dilated space Ω_n.

2.3. Tangential and Radial Paths

For o_0, the spinback of $2\Omega_n$ on Ω_0 is a tangential path on the space Ω_0 (fig. 4).

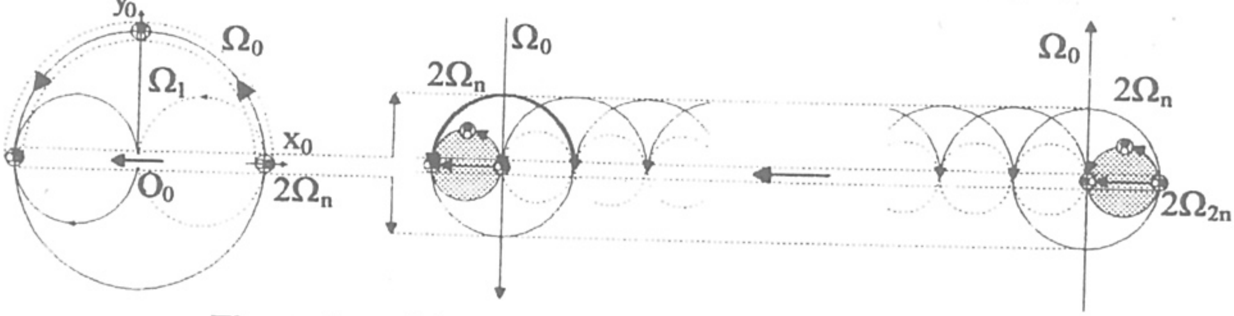

Figure 4 : radial and tangential embedded paths of $2\Omega_n$.

For o_0, 2^n radial spinbacks of Ω_n into $2\Omega_n$ seems to be a radial path into Ω_0. So, there are two kinds of spaces' or particles' paths : radial or tangential.
For o_0, the tangential path of $2\Omega_n$ on Ω_0 is πR_0. The radial path of $2\Omega_n$ into Ω_0 which corresponds to 2^n spinbacks of Ω_n into $2\Omega_n$, is also πR_0 (by definition : $2^n\pi R_n=2^n\pi R_0/2^n$).
So, during the spinback of Ω_1 in Ω_0,the radial path and the tangential path of $2\Omega_n$ are the same.

2.4. Time of Perception of the Observer

For o_0, a succession of spinbacks of Ω_{n+1} in $2\Omega_{n+1}=\Omega_n$ can be a discrete movement of fission and fusion of the particle Ω_n. If the smallest time of the perception of o_0 is the time of this spinback, o_0 doesn't perceive this periodical fission.
For the virtual observer o_{-1}, the smallest time of one no perceivable spinback of Ω_n in $2\Omega_n$ is the time of the perceivable tangential spinback of $2\Omega_n$ on Ω_0.
For o_0, this time correspond to 2^n+1 radial spinbacks of Ω_n in $2\Omega_n$ (fig. 5).

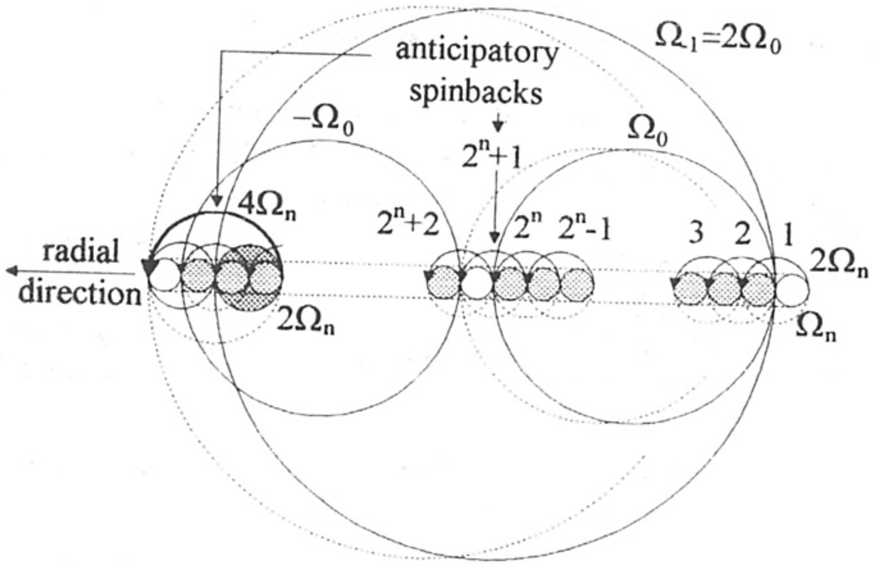

Figure 5 : dilation of spaces by anticipatory spinbacks in the radial direction.

In the same time, Ω_0 make the rotation $\pi/2$ in $-i\Omega_{-1}$ which becomes $(i)\times -i\Omega_{-1}=\Omega_{-1}\perp i\Omega_{-1}$. This rotation gives to o_{-1} in $\Omega_{-1}=2\Omega_0$ the perception of an anticipatory radial spinback of Ω_n in $2\Omega_n$.
All the embedded anticipatory radial spinbacks (from Ω_n to Ω_0) correspond for o_0 to the dilation of the initial space. In fact, this anticipation seems to transform Ω_0 in $2\Omega_0$ during the observers' exchanges. When o_0 comes back into Ω_0 after these exchanges, Ω_0 has became $-\Omega_0$ by one spinback in Ω_{-1}.
For o_0, the anticipation outside of Ω_0 has become a past inside of $-\Omega_0$. One virtual spinback of Ω_0 in $2\Omega_0$ gives one dilation ($\times 2$) of the space Ω_0 which becomes the dilated space $(i)\times -i\Omega_{-1}=\Omega_{-1}=2\Omega_0$ for o_0.

Yet, for o_{-1}, the first rotation $\pi/2$ of Ω_0 in Ω_{-1} transforms Ω_0 in $i\Omega_0$ and the second ends the spinback which transforms $i\Omega_0$ in $i^2\Omega_0=-\Omega_0$.

In the same way : $\pi/2$ of Ω_1 in Ω_0 gives the dilated space $i\Omega_0=2\Omega_1$,

and : $\pi/2$ of $i\Omega_1=2\Omega_2$ in $i\Omega_1$ gives the dilated space $i^2\Omega_0=2i\Omega_1= 2^2\Omega_2$.

Thus a succession of dilation ($\times 2^n$) can transform Ω_n in the dilated space $2^n\Omega_n=i^n\Omega_0$.

If n is even, the dilated space is $\pm\Omega_0$, the doubling is finished. The same observers o_0 and o_n can make the same transformation in their respective space in different times. So, it is possible to exchange o_0 and o_n if it is possible to juxtapose Ω_0 and $i^n\Omega_0$. With this difference of transformation's time and with the anticipatory spinback, these observers can exchange their space and time of transformation before the end of the spinback of the space Ω_0 of o_0. The first radial spinback of Ω_n in $-\Omega_0$ (fig. 5) is the last radial spinback in Ω_0 and 2^n+2 radial spinbacks are necessary to transform Ω_0 into $-\Omega_0$.

Therefore, the rate of spinbacks' speed between Ω_n and Ω_0 is 2^n+2.

One minima value of n determines together the necessary dilation of the space and the difference of perception's time between the observers o_0 and o_n.

2.5. Exchange Condition (n=3) and Dilation Condition ($2^n=8$)

The initial fission of the particle Ω_n in Ω_0 is also the initial fission of Ω_{n+1} in Ω_1, of Ω_{n+2} in Ω_2,... , of Ω_{2n} in Ω_n and so on (fig. 6). When $\varphi_0=\varphi_1/2=\pi/2$, the space Ω_1 becomes $i\Omega_1\perp\Omega_1$ and because of the operator i, the perceivable space for o_1 is the dilated space $i\Omega_0 =2\Omega_1$. The particle Ω_{n+1} fuses at the centre O_0.

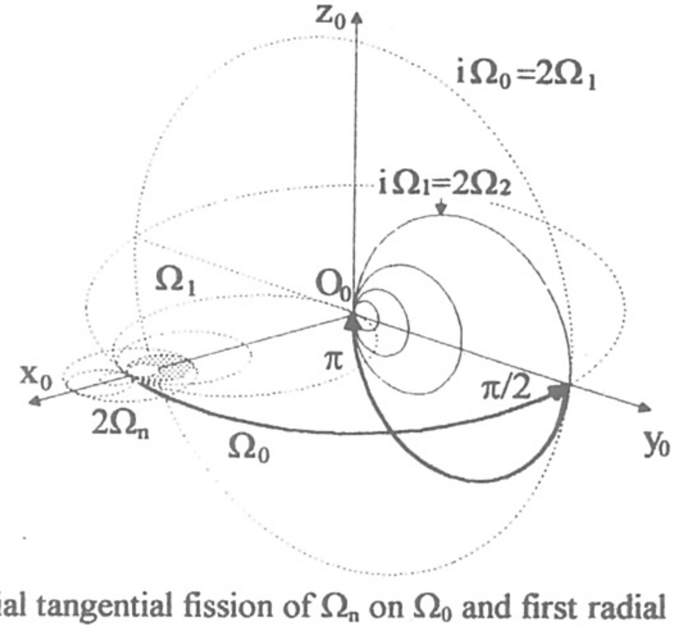

Figure 6 : initial tangential fission of Ω_n on Ω_0 and first radial fusion of Ω_{n+1} on $i\Omega_1$.

This radial and intermediate fusion gives to o_1 the initial conditions in this dilated space $i\Omega_0=2\Omega_1$ for the perceivable particle $i\Omega_{n+1}=2\Omega_n$. As the spinback of $i\Omega_1$ in $i\Omega_0$ is twice faster than the spinback of Ω_1 in Ω_0, the rotation $\pi/2$ of $i\Omega_n$ on $i\Omega_0$ corresponds to the rotation $\pi/4$ of Ω_n on Ω_0 (fig. 7). It corresponds also to a radial fission of $i\Omega_n$ on $i\Omega_0$ and

a tangential fusion of $i\Omega_{n+1}$ on $i^2\Omega_0$. This second intermediate fusion gives to o_2 the initial conditions in this dilated space $i^2\Omega_0=2^2\Omega_2$ for the perceivable particle $i^2\Omega_{n+2}=2^2\Omega_n$.
If the initial space Ω_0 is three dimensional for o_0, the initial space Ω_0 and the dilated space $2^n\Omega_n=i^n\Omega_0$ can be juxtaposing when n=3. In fact, the rotation $\pi/2$ of $i^2\Omega_n$ on $i^2\Omega_0$ corresponds to $\pi/4$ of $i\Omega_n$ on $i\Omega_0$ and $\pi/8$ of Ω_n on Ω_0 (fig. 7). It corresponds also to the tangential fission of $i^2\Omega_n$ on $i^2\Omega_0$ and the radial fusion of $i^3\Omega_n$ on $i^3\Omega_0=8\Omega_3$.

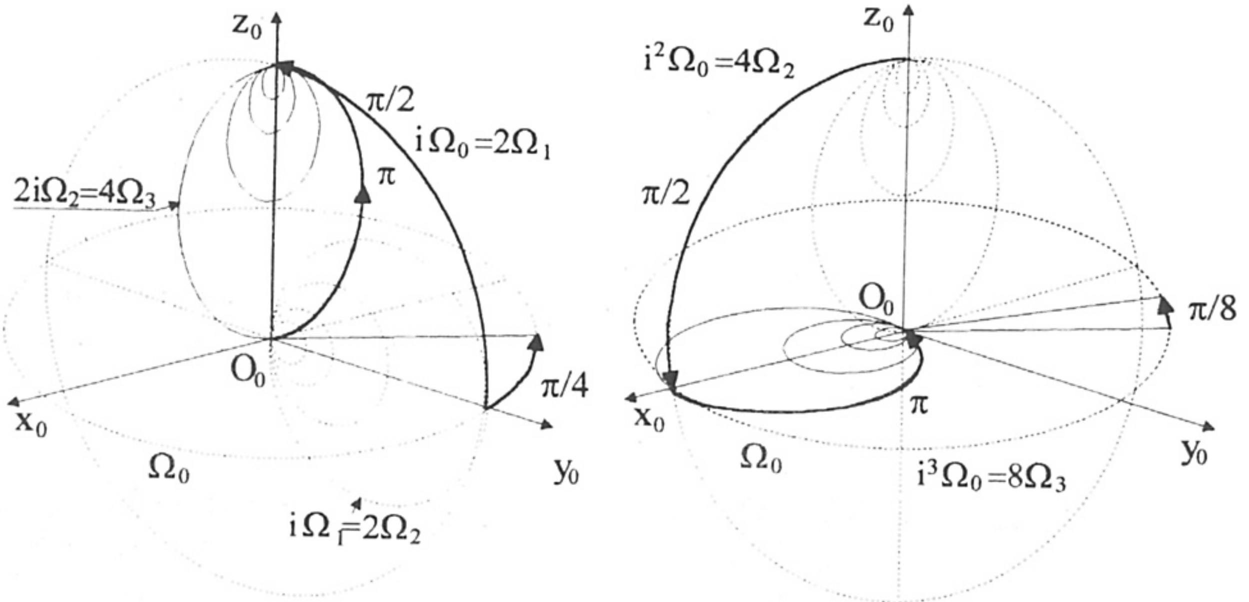

Figure 7 : fission-fusion in $i\Omega_0=2\Omega_1$ and fission-fusion in $i^3\Omega_0=2^3\Omega_3$.

If the initial particle is Ω_3 on Ω_0 into $2\Omega_3$ (n=3), the dilated space $i^3\Omega_0=8\Omega_3$ and Ω_0 are juxtaposed after the rotation $\pi/2+\pi/4+\pi/8=7\pi/8=\pi-\pi/8$ of $2\Omega_3$ on Ω_0.
The rotation φ_3 of the particle on $8\Omega_3$ is 8 times faster than the rotation φ_0 of the particle on Ω_0. The spinback in $8\Omega_3$ corresponds to the rotation $\pi/8$ on Ω_0.

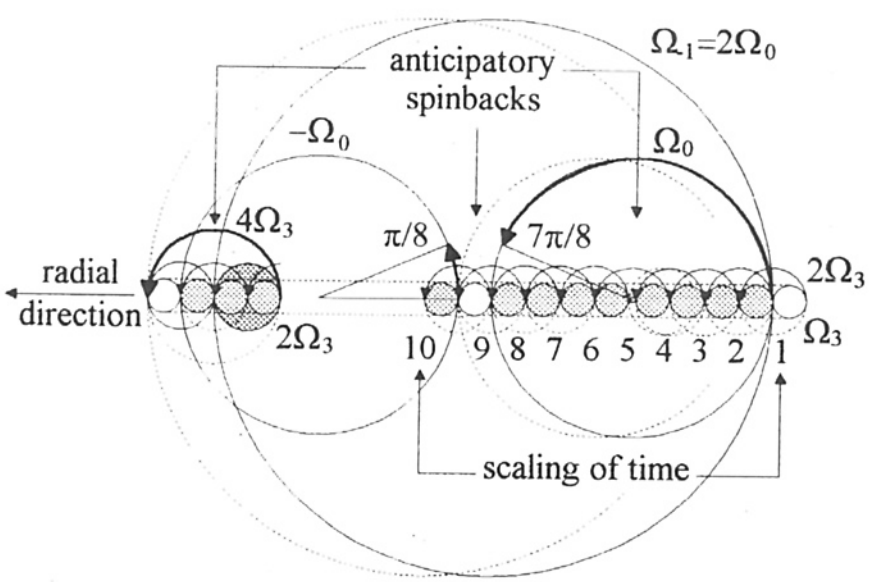

Figure 8 : scaling of time for the exchange of o_0 and o_3

The juxtaposition of the spaces Ω_0 and $8\Omega_3$ (after the dilation of Ω_3 which becomes $8\Omega_3=\Omega_0$, after the rotation $7\pi/8$ on Ω_0 and after the time of 1+2+4=7 radial spinbacks of Ω_3), allows o_0 and o_3 to exchange their spaces (fig. 5&8).
With the dilation of Ω_3, the 8[th] and last radial spinback of Ω_3 into Ω_0 seems to be the tangential spinback on Ω_0 for o_0. It allows o_0 and o_3 to begin their exchange.

2.6. The Double Exchange of the Observers in a Ten-Dimensional Space

The third intermediate fusion in $i^3\Omega_0$ is radial at the centre O_0 of the initial space (fig. 7) which is also the centre O_3 of the dilated space $i^3\Omega_0$ (fig. 9). The time of the juxtaposition of the spaces $i^3\Omega_0$ and Ω_0 allows the exchange of the observers o_0 and o_3. It is the time of one spinback on $i^3\Omega_0$ and the time of the rotation $\pi/8$ on Ω_0. For o_0, the spinback in $i^3\Omega_0$ is 8 times faster than the spinback in Ω_0. During the rotation $7\pi/8$ on $i^3\Omega_3$, o_0 makes the same transformation again. At the end, the 6[th] fusion in $i^6\Omega_0$ is tangential (fig. 9).
$i^6\Omega_0$ and Ω_0 are juxtaposed. For o_0, $i^6\Omega_0=-\Omega_0$ and the initial space Ω_0 is dilated and the virtual observer o_{-1} is the real observer o_6.

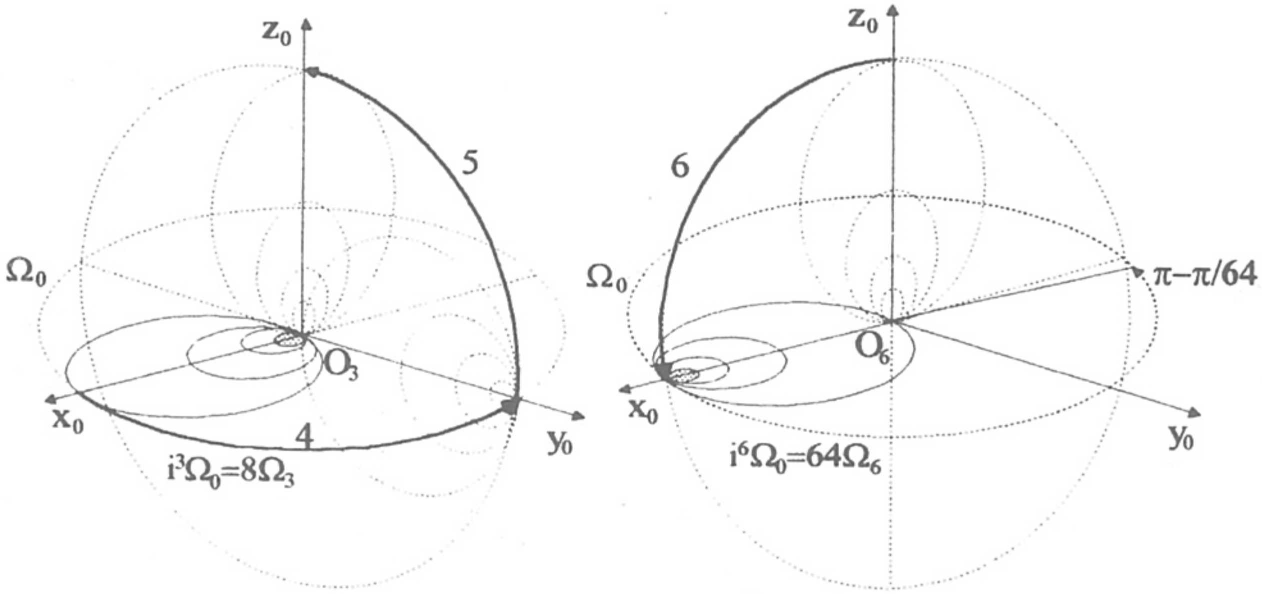

Figure 9 : the sixth fusion on $i^6\Omega_0=2^6\Omega_6=-\Omega_0$

The transformation of doubling is observed by o_0 in the same way in Ω_0 and $-\Omega_0$ but ten times faster in Ω_0 than in $-\Omega_0$ (fig. 8). During the tangential rotation $7\pi/8$ of the particle $i^6\Omega_3$ on $i^6\Omega_0$, the initial particle$2\Omega_3$ makes the rotation $\pi/16+\pi/32+\pi/64=\pi-\pi/64$ on Ω_0 (fig. 10).
So, the spinback of $2\Omega_3$ on Ω_0 is not finished. During the last rotation $\pi/64$, o_0 can do the same transformation again, faster and faster. Yet, o_0 must stop the transformation after the sixth transformation. In fact, the first observers' exchange puts o_3 in the initial space : o_3 has not the perception time in Ω_0. This observer cannot modify the initial space. In the time of the seventh radial transformation into $i^6\Omega_0$, the 8th radial path into

Ω_0 allows o_3 to perceive Ω_0 (which is becoming $-\Omega_0$). Because of this perception, o_3 can modify the initial space. I can say that the initial space Ω_0 of o_0 is opening towards $-\Omega_0$ after the rotation $7\pi/8$ of the particle $2\Omega_6$ in the space $i^6\Omega_0$. In order to be always the initial observer of Ω_0 and $-\Omega_0$, o_0 must stop the doubling transformation before this perception.

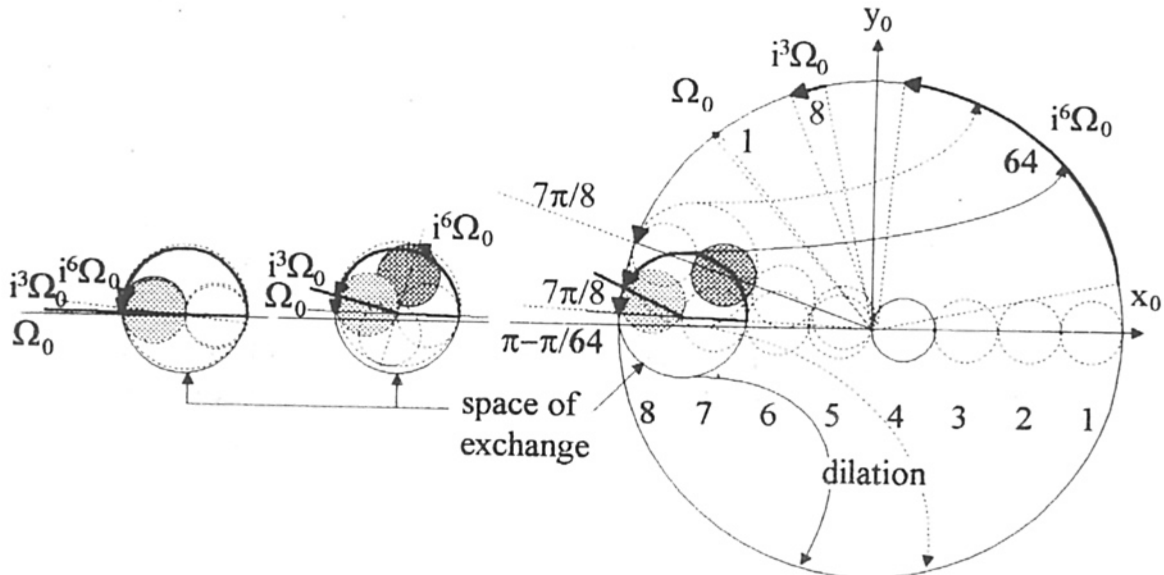

Figure 10 : juxtapositions of spaces for the observers' exchanges

So, there are six doubling transformation to transform the virtual observers o_{-1} to the real o_6. And before the end of the spinback in the sixth space Ω_6, a final and second exchange puts the observers again in their respective space.
The future of o_3 experimented by o_0 (with o_6) in a time no perceivable by o_3 is now the past of o_3. In other words, o_0 owns an experiment of o_3 in an instantaneous time. For o_0, it is a time of reflex. Only o_0 has time to experiment with o_6 a new present of o_3 (which is a consequence of the future of o_2, o_1 and so o_0) and to transform it into a past for o_1, o_2,..., o_6= o_{-1} in a reflex time of o_0 which becomes $-o_0$ in the initial space Ω_0 which becomes $-\Omega_0$. With this new past (and during the next transformation of o_0) o_3 can experiment a new future which becomes a past for o_6 and so on. The second spinback of the initial space allows $-o_0$ to become o_0 again in $-\Omega_0$ which becomes Ω_0 again after a new experience. Another exchange during the final juxtaposition of spaces allows o_0 to discover the future which o_3 can do. This future which o_0 experiments with o_6, give to o_0 a new reflex. So, this discrete transformation which is made in a reflex time of the initial observer, transforms an initial system into anticipatory embedded systems always ready to evolve with the full knowledge of its possibilities.

2.7. The Three Perceptions of the Space for the Initial Observer

This doubling transformation uses 4 three-dimensional spaces. But the necessary final juxtaposition uses the initial plane (2 dimensions). So, the space of the doubling

transformation is a ten-dimensional space for the initial observer, but each embedded observer only perceives 3 dimensions. This reduction of dimensions gives to each observer the possibility to be the initial observer of its space during the doubling transformation. Yet, at the end, 9 of the 12 dimensions are juxtaposed and the ten-dimensional space becomes a three-dimensional space for all the embedded observers. The initial observer discovers in the same three-dimensional space the spaces of embedded observers in the time of the final juxtaposition. With scalings of spaces and times, all these observers have the same perception which is the perceptions of a three-dimensional space. Because of these scalings, each observer has different limits of times' and spaces' perception but, at the end of the doubling, three observers of the doubling transformation must perceive the same constant speed of light in three juxtaposed spaces. For that, scalings must disappear. Consequently, for the embedded observers o_0, o_3 and $o_6=o_{-1}$ the perception of the surrounding spaces changes without change of time of transformation.
If C_0 is the constant speed of the doubling transformation for o_0, I notice $(C_0)o_0=C_0$ observed by o_0 and I can write the next relations :

$$(C_{-1})o_{-1}=(C_0)o_0=(C_3)o_3 \quad (1)$$

$$(C_{-1})o_{-1}\neq(C_0)o_{-1}\neq(C_3)o_1 \text{ or : } (C_{-1})o_0\neq(C_0)o_0\neq(C_3)o_0 \text{ or : } (C_{-1})o_3\neq(C_0)o_3\neq(C_3)o_3 \quad (2)$$

So, I calculated these three speeds of doubling which are never observed by any observer in the same time in the same space. Yet, to begin the doubling transformation ,these three speeds are necessary for the initial observer.

3. Three Perceptions of the Speed of Light in the 10-Dimensional Space

3.1. Equation of the Exchange of the Observer and the Speed of Light

With the scaling of times e_t and the scaling of space between o_{-1} and o_0 defined in a previous paper (Garnier-Malet, 1997) so that :

$$e_t=2\sqrt{\pi} \text{ and } e_t\, e_d=1 \quad (3)$$

the exchange equation between o_{-1} and o_0 is :

$$(4\pi R_{-1}R_0)o_{-1}=i(\pi R_0^2)o_0 \quad (4)$$

The index o_{-1} or o_0 signifies : observed by o_{-1} or o_0. i is the operator of the doubling transformation defined in this paper (2.2.).R_{-1} is the unitary radius so that :

$$(R_{-1})o_{-1}=(1)o_{-1} \quad (5)$$

With the exchange equation (4), I have calculated in the same paper (Garnier-Malet, 1997) the speed of the exchange which defines the perception of the observer :

$(C_3)o_3 = 54.10^6\pi^2\sqrt{\pi}(R_3)o_3$ in the time of one spinback $(\pi)o_3$ (6)

This speed is constant for the third observer in the third space and with the perception of this embedded space. By definition of the fundamental movement, this perception is independent of the movement of the observer. So, the speed of the exchange is independent of the speed of the observer. Above all, it is the speed of the transformation which is necessary to make the final juxtaposition without any perceivable change of the space. The application of the fundamental movement to the solar system (Garnier Malet, 1997) shows us that the human observer is o_3 in the third space of the Earth. With time $(\pi)o_3$ and space $(R_3)o_3$ defined by our planet, I have found :

$(C_3)o_3 = 299\ 792$ km/s (7)

3.2. The three Perceptions of the Speed of Light.

The definitions of the fundamental movement allows to calculate the three different speeds. These speeds are never observed by the same observer in the same time and space during the doubling transformation but they can explain many paradoxical phenomenon in our Universe.

Each intermediate juxtaposition implies a difference of perception of the doubling movement. This movement of spinbacks is ten times faster in the initial space Ω_0 than in the doubling space $i^6\Omega_0 = -\Omega_0$ (fig. 8). The six necessary intermediate juxtapositions (fig. 6-7-9) imply a difference of perception 10^6 times faster in the initial space than in the 6^{th} space.

The external observer $o_6 = o_{-1}$ perceives a space 7 times larger than the space of the internal observer o_3. Because of scalings of spaces and times, in a space 6 times smaller, o_3 perceives the outside 7 times less large than the same space which is perceived by the external observer. During the final juxtaposition, the dilation by 2 of the space and a difference of perception (10 spinbacks for 1) balance the perceptions of the internal and external observers on the common boundary. So, I obtain the following relations :

$(C_{-1})o_3 = 7(C_0)o_3 = 7(49/12)10^5(C_3)o_3$ (8)

3.3. Times of Openings and Closings of Spaces

The radial path of the particle Ω_n into Ω_0 during the tangential path of $2\Omega_n$ on Ω_0 is πR_0 for all observers (2.3. fig. 4).It is not perceivable by o_{-1} which only perceives $2\Omega_n$. Each radial path is never rectilinear. It is always a tangential path for another observer.

The periodic fissions and fusions of the particle Ω_n take place $\forall n$ on the radial axis $A_nA'_n$ (fig. 11). These points A_n and A'_n are obligatory points of passage when the particles fuse at the end of the spinback.
During the spinback, the space is closed. After the rotation $7\pi/8$, I can say that the spinback opens and closes the spaces by the junction between the radial and the tangential paths.

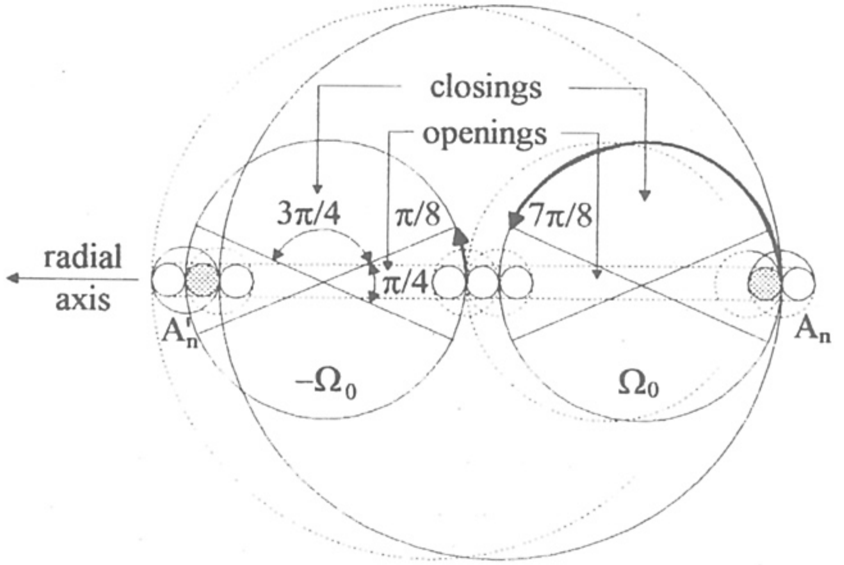

Figure 11 : openings and closings of spaces

These openings and closings of spaces are a new important discovery.
When the anticipatory embedded spaces are opened during the final juxtaposition, the three speeds of doubling transformation (8) give to the particles the possibility to change its speed (fig. 12).

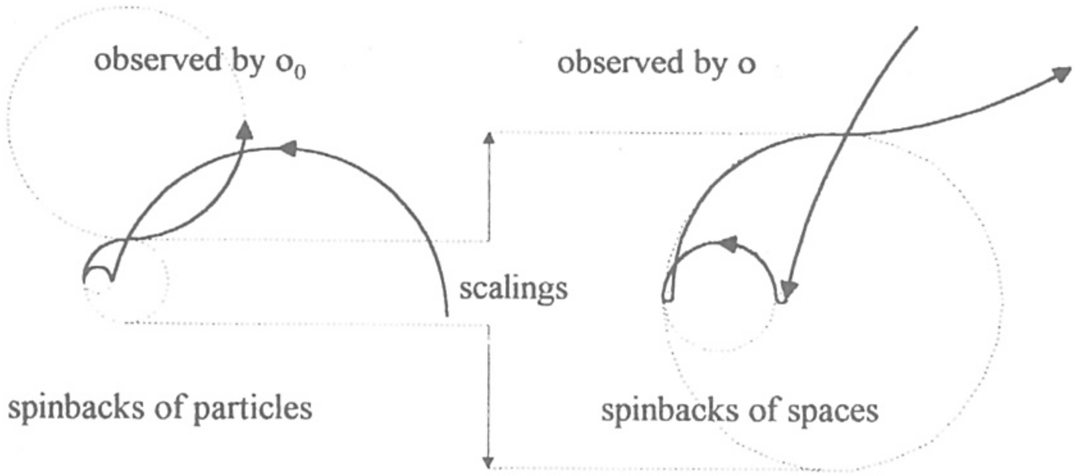

Figure 12 : for o_0, apparent brutal changes of speed and direction

The exchange of the radial and the tangential paths allows a particle (or a space) to change its speed of doubling transformation.
Because of times' and spaces' scalings, the observer sees an abrupt change of speed or direction of the observed particle which makes many spinbacks. When leaving a space, the observer finds a new space in which the speed of light is always the same.
Moreover, the traveller who explores a new space, is moving with the speed of this space which is a particle of another space and so on. He must know the calendar of openings and closings of embedded spaces. In the solar system, this openings can explain the brutal accelerations of the solar particles which are often observed but never explained. In fact, the gravitational balance is never an instantaneous phenomenon but a succession of balances. The openings of spaces can exchange (and never modify) a radial one-dimensional path into a tangential two-dimensional space.

3.4. One-Dimensional Space

For the initial observer o_0, the radial path of α_n is always one-dimensional. Yet, because of the final exchange of o_0 and o_n, the intermediate dilated space (fig. 14) and the initial space seems to be identical for o_0 and o_n.

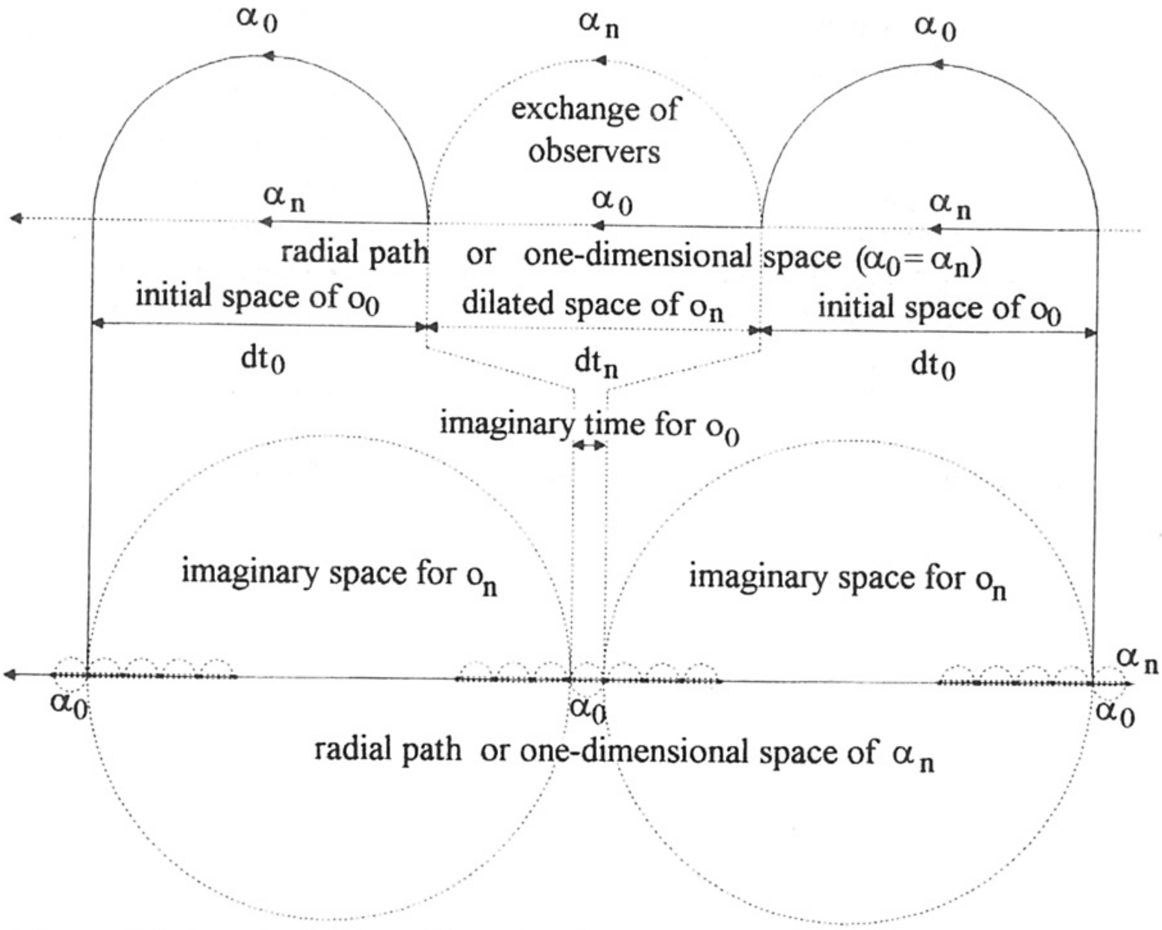

Figure 13 : imaginary three-dimensional space around a one-dimensional space.

For o_0, the time dt_n is an imaginary time in the initial space (that is to say a reflex time). For o_n, the time dt_0 is the spinback time of an imaginary space which becomes perceivable for this observer only at the end of the spinback of the initial space.
Yet, for o_n, this imaginary space is perceivable during the exchange of o_n and o_{2n} that is to say in a reflex time. So, the final exchange of o_n and o_0 transforms a time of dreams into a time of the perception of a imaginary space. For o_n, it transforms an imaginary space into the initial space. For o_0, it transforms an imaginary time into the initial time.

3.5. Two-Dimensional Space

The initial observer o_0 observes in the initial plane space Ω_0 the initial particle α_0 which makes its tangential spinback (fig. 15). When $\varphi_0 = \pi/4$, $\pi/2$, $3\pi/4$, $\pi-\pi/64$, π, the tangential positions of α_0 on Ω_0 (1-2-3-4-5-5) correspond to internal or radial fusions of the particle (positions 1-2-4-5-6).

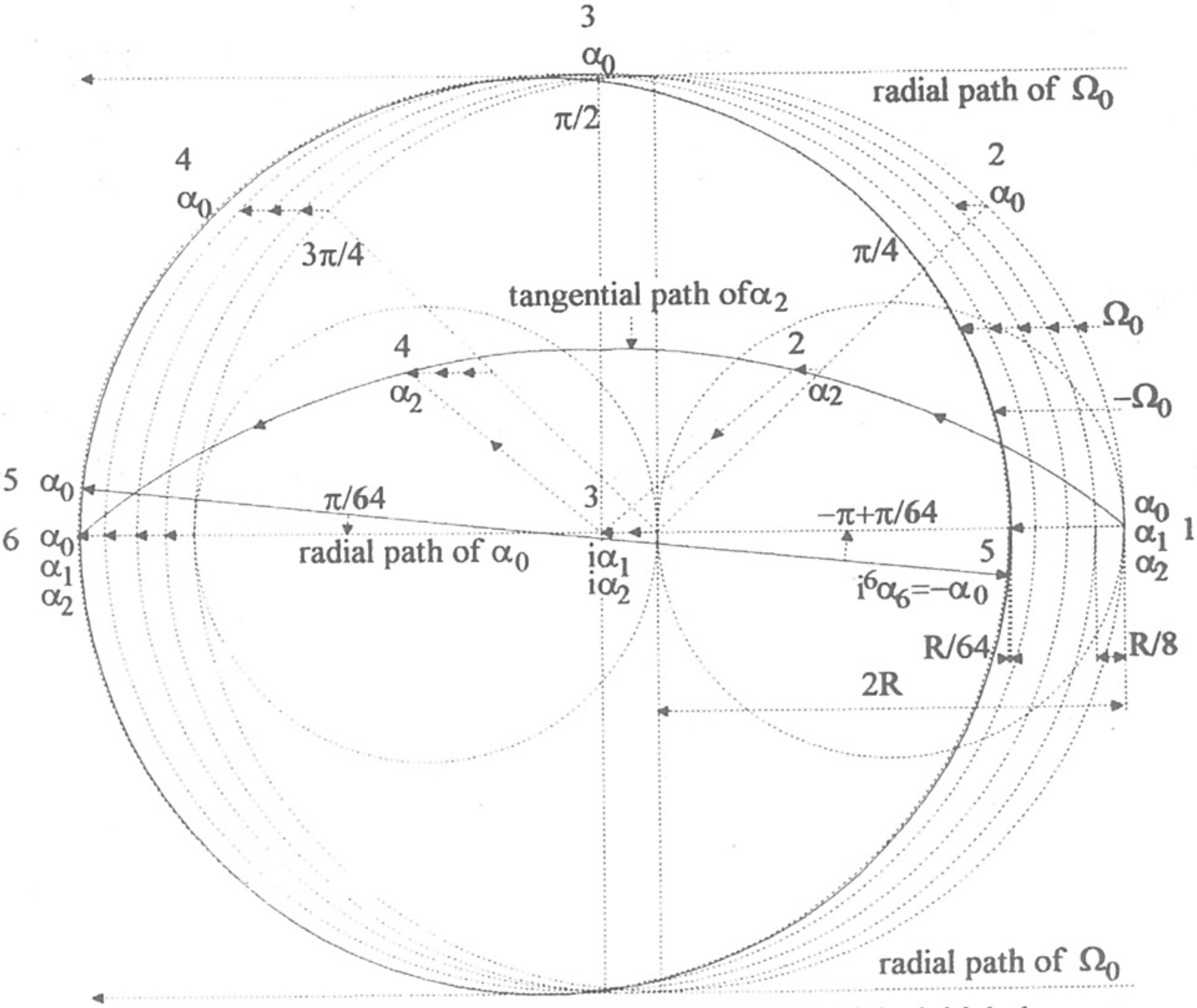

Fig. 14 : doubling in the initial two-dimensional space of the initial observer.

When $\varphi_0=\pi-\pi/64$, the tangential position of α_0 on Ω_0 (position 5) corresponds to a radial position of $i^6\alpha_6$ on a dilated space $i^6\Omega_6$ (position 5) which seems to be $-\Omega_0$ for o_0

after the rotation $-\varphi_0=-\pi+\pi/64$ (n°2.6.). For o_0, the doubling of the particle α_0 exists on $-\Omega_0$ which is the position of Ω_0 before the 64th rotation $\pi/64$ of α_0 on Ω_0 and before the 64th spinback of $-\alpha_0$ on $-\Omega_0$ (64 times faster than the spinback of α_0 on Ω_0).
The dilation of the radial space-Ω_0 allows the observers' exchange just before this last 64th spinback For o_0 which doesn't perceive α_2 in Ω_0, the fusions of α_2 are perceivable in the dilated plane space $-\Omega_0$ where they seem to be on a tangential path (positions : 1,2,4,6) around the radial path of α_0 (positions 1&6).
Because of the dilation of the radial space $i^6\Omega_6=-\Omega_0$, the particle α_2 seems to be a perceivable tangential particle $-\alpha_{-1}=i^6\alpha_2$ for o_0. Only a final dilation (which corresponds to the 64th spinback of $-\alpha_0$ on $-\Omega_0$ at the end of the spinback of Ω_0 into Ω_{-1}) allows Ω_0 and $-\Omega_0$ to juxtapose in the initial plane which becomes the new initial doubled plane space $\pm\Omega_0$ in a new virtual plane space or horizon Ω_{-1}.

3.6. Final Dilation of Our Perceivable Three-Dimensional Universe

The three different perceptions of the speed of light allow the observer o_3 (who we are) to calculate the dimensions of our perceivable Universe at the end of the solar cycle (24840 years) without forgotten the anticipation (1080 years) before and after this cycle (fig. 13). Now, after a final dilation (or expansion), our Universe becomes the initial dilated space of o_{-1} which corresponds to the final dilation of the initial solar space for o_3. It is the goal of the doubling which must allow the observers o_0 and o_3 to exchange spaces and times of transformation without modifying their initial space during their time of perception.

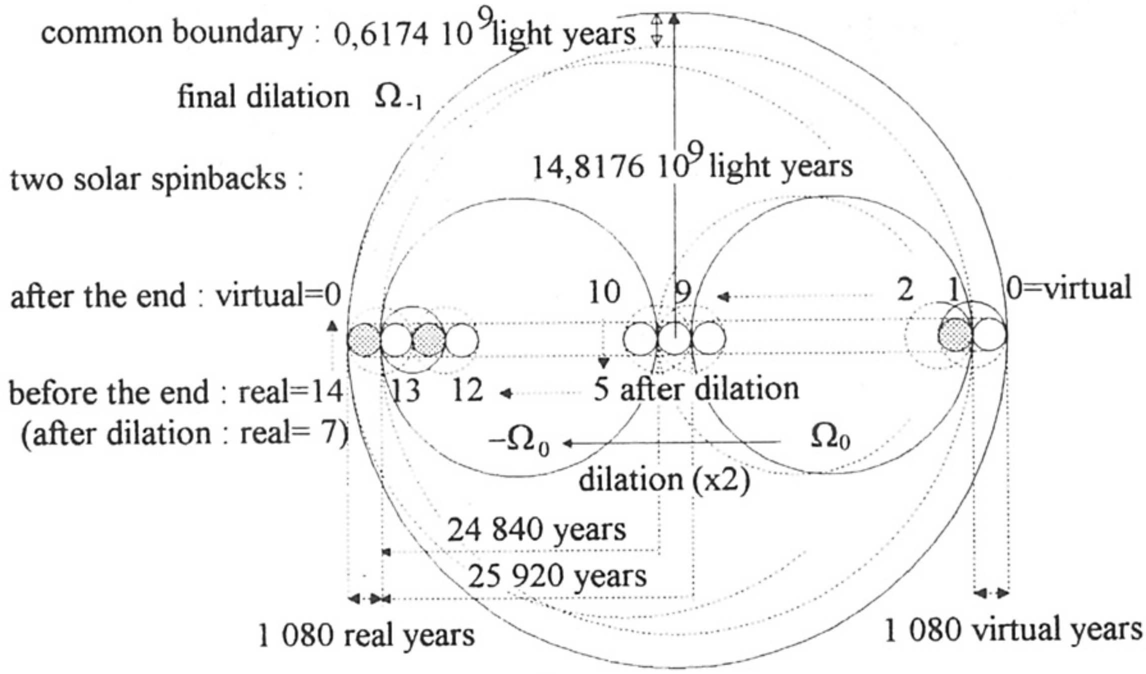

Fig. 15 : the expansion of our Universe at the end of the solar spinback

The first tangential spinback of Ω_0 dilates the space (×2). So, the 10[th] radial spinbacks into Ω_0 becomes the 5[th] into $-\Omega_0$. The 14[th] radial spinback into $-\Omega_0$ ends the second tangential spinback of Ω_0 (or the first of $-\Omega_0$). After the dilation of the second spinback of Ω_0, the 14[th] becomes the 7[th] into $-(-\Omega_0)$ which becomes a new space Ω_0 into $-\Omega_{-1}$. This last real radial spinback into $-\Omega_0$ of Ω_{-1} becomes a virtual spinback outside of this new space for the initial observer o_{-1} which becomes o_0 again in $-\Omega_{-1}$.
The equation (8) give the rate $(343/12)10^5$ of perception of the doubling speed between o_{-1} and o_3. Because the dilation (×2) and the acceleration of the movement (from 1 to 10) between the spaces Ω_0 and $-\Omega_0$, the radius of the circular horizon of o_3 corresponds to the years which are necessary for the radial path when the speed of the doubling is no more $(C_3)o_3$ but $(C_{-1})o_3=(343/12)10^5(C_3)o_3$.
Therefore, for the observer o_3, this distance becomes the following light years :

$$(R_{Universe})o_3=25\,920\times(2/10)\times(343/12)10^5=14{,}8176\ 10^9 \text{ light years} \quad (9)$$

So, at the end of the solar spinback, it is the maximum dilation of our Universe which is perceivable by the observer o_3 (who we are).
The anticipation (fig. 13) corresponds to a common boundary (or a perceivable space corresponding to 1 080 years) between the spaces of o_{-1} and o_3 :

$$1\,080\times(2/10)\times(343/12)10^5=0{,}6174\ 10^9 \text{ light year} \quad (10)$$

We must notice that the age of the Universe cannot be calculated by using the speed of light $(C_3)o_3$=299 792 km/s. Only the number of the spinbacks of our Universe can give to us this age. It is not possible to observe this number before the end of our solar spinback. Only the beginning of the next spinback allows o_3 to perceive the real radial distance into the Universe which corresponds to the real age of the Universe. Yet, with the knowing of the age of our solar system Δt_s, it is possible to calculate this number. Inside of the solar system, we can observe the radial path of the Universe which corresponds to the following light years :
$14{,}818\ 10^9$=equation (9)
minus the final space of anticipation $0{,}617\ 10^9$=equation (10)
minus the virtual initial space $0{,}617\ 10^9$=equation (10).
So this radial path is for o_3 :

$$14{,}818\ 10^9-0{,}617\ 10^9-0{,}617\ 10^9=13{,}583\ 10^9 \text{ light years} \quad (11)$$

By several observations and experiments, we know that our solar system is about $4{,}5\ 10^9$ years old. Therefore, $13{,}583\ 10^9/(4{,}5\ 10^9)=3{,}018$ spinbacks of the Universe are been necessary.

We are now at the end of the solar spinback (24 840 years) which must correspond to the end of one spinback of the Universe. Consequently, this spinback must be strictly the third spinback and the age of our solar system must be exactly :

$$\Delta t_{solar} = 13{,}583\ 10^9/3 = 4{,}528\ 10^9 \text{ years} \quad (12)$$

So, I verify the link (equations : 3,4,5) between the dilation (or expansion) of our Universe (space of o_0) and the age of our solar system (time of o_3).
It is very important to notice that our perceivable Universe (observed by Hubble's telescope) is going to correspond to the theoretic perceivable distance 14,8176 10^9 light years (9). So, this final expansion of our Universe opens all the embedded spaces just at the end of the cycle of our solar space $-\Omega_0$ in the Universe Ω_{-1} which is actually becoming Ω_0 in $-\Omega_{-1}$. After 24 840 years of closing, this spaces opening involves observers' exchanges just before this end.

4. Conclusion

The fundamental movement of doubling which transforms any evolution system in anticipatory embedded systems allows us to know the solar cycle of 24 840 years (Garnier-Malet, 1997) and, above all, to understand the many perturbations which the present end of this cycle brings now to our planet.
These perturbations are the consequences of a necessary new solar balance which depends on very important new physical notion : the openings and closings of six double spaces embedded in the same doubling transformation.
These openings which imply times of gravitational modifications, are the principal cause of future perturbations of our space during the final solar juxtaposition which puts three embedded observers o_0, o_3, $o_6 = o_{-1}$ in the same three dimensional space. They balance together our planetary envelope in our solar system and our planet around its kernel which is a space using the same transformation.
Six successive openings of the spaces modify the perception of our Universe at the end of the solar cycle of doubling transformation. In six times, this very imminent end gives us the possibility to observe our surrounding initial ten-dimensional space, to understand the new planetary perturbations and maybe to avoid them. For that, we must use and anticipate the movements of doubling of all anticipatory embedded spaces, without never forgetting the particles' movements which are always spaces' movements of another observer embedded in the same doubling transformation.
It is impossible to change one particle of any space without modifying the space. It is dangerous to change spaces without reason because that changes the particles of spaces. If we can understand that, we will begin to understand our responsibility in the future planetary perturbations.

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