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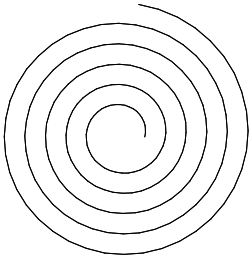
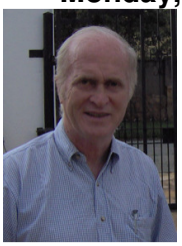


EX SPIRA AQUA MUNDA

Monday, 29 April 2013



Part 1

The concept of equivalence in the Universal Dynamics

(Boyle's Law and Hooke's Law as special cases of the Universal Law in the Universal Dynamic Science)

The concept of equivalence in the Universal Dynamics and phenomena associated to gravitational depression acting over an elastic mass requiring reference to Energy as active Force (Work) causing presence of elastic movements generating Force in opposition (extension of Newton's 3rd Law to Energy as active Force opposed by an elastic Force supplied by the Ether/ESF or by the inertial mass(Mi) inside a mass etc….

Ref: (GSJournal.net Ruggeri A. 5-April-2013)

Note: the elasticity topic and its connection to gravity, space and time in presence of the Ether/ESF (and its role in degradation of Energy) was presented in essential form in the previous paper (in which the UL-UDS was developed) and in this paper but will be treated more in depth in future papers.

Note: these advances in physic studies due to stubborn resistance to evolution of understanding have given rise to a dichotomy between truth and practice which, as it is, today is based on conventional systems of calculations still stuck to the old

fashioned formulations avoiding the concepts of equivalence of mass-Energy to Energy in most of the engineering activities.

We scrutinize now the behaviour of a mass M made up of atomic entities kept together by substance of elastic characters defined “interstitial mass (Mi)”.

That gravitational depression over a mass M impeded to move by contact Force against a rigid surface is producing inside it presence of a “Static mass Force F in [kJ]” could be a simple answer to the physical problem.
Nevertheless observation at a deeper level shows us that the phenomenon to which M is subjected when it is placed over the rigid surface is associated to movement “of elastic character taking place inside M, during a time interval”, an aspect, betraying that the physical description made above is incomplete and other intermediate phenomena are present inside M before the Force “F” is fully opposed by contact Force “–F”.
The following expression:

$$\supset \Delta\left(c^2-\frac{kM_{LGM}}{4\pi r}\right)_{r_2}^{r_1}=\frac{kM_{LGM}}{4\pi}\left(\frac{1}{r_2}-\frac{1}{r_1}\right)=$$

$$=\frac{kM_{LGM}}{4\pi}\left(\frac{1}{r_2}-\frac{1}{r_1}\right)=\frac{kM_{LGM}}{4\pi}\left(\frac{r_1-r_2}{r_1 r_2}\right)\cong a(r)\ (r_1-r_2)$$

Represents a value of specific depression a(r) in kJ of the Ether/ESF extended from r_1 to r_2 and generating a pulling Force over a column of $1m^2$ cross section and height $\Delta L=(r_1-r_2)$ filled by mass of density $\rho=1$, that if extended to a number of adjacent columns whose cross surface is A filled of mass of density ρ and still high ΔL gives:

$$F=\rho*A*\Delta L*a(r)=Ma(r)\ [kJ]$$

Since the above expression is difference of quantities of Energy proceeding from a Potential to produce transformation-degradation acting over M, it results that the gravitational active mass Force is in units of Energy and the contact Force in opposition though not Energy and not result of transformation-degradation of mass-Energy can also be expressed in units of Energy, (see graphic below):

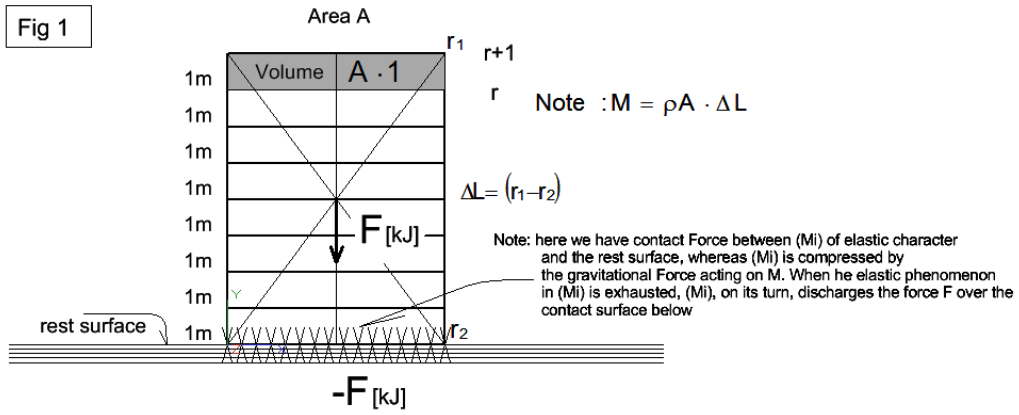
Gravitational depression in the Ether/ESF (for the unit of volume)

$$E(r)=\left(c^2-v(r)_0^2\right)=\left(c^2-\frac{kM_{LGM}}{4\pi r}\right)\left[\frac{kJ}{m^3}\right]$$

$$Vdp=A\cdot 1\cdot\rho\cdot\Delta\left(c^2-\frac{kM_{LGM}}{4\pi r}\right)_{r_2}^{r_1}=-A\cdot\Delta L\cdot\rho\ \frac{kM_{LGM}}{4\pi}\left(\frac{1}{r+1}-\frac{1}{r}\right)=Ma(r)=F\ [kJ]$$

Note: the intent of this graphic is to demonstrate that the gravitational Force being the difference of two amounts of Energy flow has the dimensions of Energy in [kJ] induced in M as "Potential (capacity to release) Energy" from mass-energy beloging to M

Fig 1



The gravitational depression which acts over the mass M is producing inside it a Static mass Force which has the capacity to start movement of M towards the centre of the M_{LGM} and now since we consider the case in which movement of M is impeded we have a phenomenon "in cascade" acting over M.

This phenomenon cannot be dismissed through the identification of a contact Force directed against M, resting against a perfectly rigid body and perfectly opposing the Static F, since the F gravitational being a mass Force to reach the rest surface must be transmitted and such a medium is the interstitial mass (Mi).

It happens that whilst the gravity is almost entirely acting over the atoms, in virtue of the fact that the atoms are glued to the interstitial mass (Mi) and of the fact that the Static (gravitational) Force has the capacity to start movement and of the fact that (Mi) is highly compressible in respect of the atoms, which (in this context) can be considered almost incompressible, we have that the mass M in consideration, being in conditions of existence made up of atoms bound together by "interstitial mass (Mi)" , and moving whilst elastically compressing (Mi), inside the gravitational field of depression, is subjected internally to gravitational internal transformation-degradation of mass-Energy internal to it, releasing Energy of movement and still in virtue of presence of (Mi) undergoes a series of physical events developing inside it.

These physical events are consisting of elastic phenomena in a context in which there is a phenomenon releasing of Energy as Heat and dissipation taking place over a time interval commonly going under the name of friction, ("friction" is worth to investigate since it induces on a mass under elastic deformation a relativistic effect causing degradation of Energy possessed and release of part of it as Heat on a continuous time basis, it will be analyzed in the due course).

Note: no friction is loss of Energy by the atoms through degradation of mass-Energy contained in them and is tied up to the compression $p=\rho v^2$ (pure opposite Force or reaction of the Ether/ESF surrounding the atoms endowed of Energy and moving inside a volume V.

Once the interstitial (Mi) is compressed enough to withstand the compressing power of the gravitational Force acting on M, the system is settling in a status of permanent “apparent quiet” whereas the gravitational Force has been transmitted through strong contact of the atoms to the (Mi) and from the (Mi) on the contact surface (the one impeding movement of M), it is now to be noted that the (Mi) there is transmitting the contact Force.

Note: “Natura, vacuum horret nec immobilem esset”.

Gravity whose origin depends from absorption of Ether/ESF on a continuous basis by a mass M_{LGM} acts on a mass M, resting over it, also on a continuous basis, developing inside it continuous transformations-degradations whose nature (on Earth) may not appears to our senses and to our finest measuring instruments.

Considering that a mass is made up of highly incompressible atoms bound together by interstitial mass of elastic characters, we have that the mass Force F=Ma(r) that gravitational depression induces mainly in the atomic entities of M, whilst giving M tendency to move, due to presence (inside M) of compressible interstitial mass (Mi) of elastic nature, cannot avoid to act on it.

This compression of the (Mi), occupying a portion ΔVi of V, usually very small, and sticking to the atomic entities (of M impeded to move) is consequently cause of reduction of volume (from V to V'<V) so that we can say that the mass M subjected to the Static F (Force) undergoes an elastic reduction of part of the volume $\Delta Vi > V-V' = \Delta V$ in virtue of the presence of (Mi) between the atoms and whilst M is being impeded to move, F carries on discharging its full value, through elastic deformation of (Mi) and contact of the (Mi) to the rigid contact surface beneath.

We, then, have now that the Static Force whilst discharged over the contact surface beneath the mass M, is compressing a portion of the (Mi) present in M occupying a volume $\Delta V < \Delta Vi$.

Being now the Static Force an agent of change it is necessary to take in consideration that in this context is representing a “Potential” capacity to produce internal transformation in M, (once movement occurs), which releases Energy belonging to the mass M.

I make reference now to what was the Static mass Force with a new alternate name, “Potential (to release) Energy”, in effect to the Static Force/Potential Energy is opposed, inside M, the elastic presence of an amount of substance in the status of interstitial mass (Mi) occupying a portion $\Delta V < \Delta Vi$ belonging to the whole V occupied by the mass M at ρ density.

Note: I avoid here to describe the phenomena associated to insertion of external active Force …as a dm of mass, equivalent to the compressing mass Force (Energy) released over M (impeded to move), and distributed inside it , this will be dealt in future papers (if and when considered necessary).

The 1) below describes the internal elastic opposition to a gravitational Force acting on M since E=Ma(r) can be described (in Potential terms) through the Universal Law in the UDS (UL-UDS) (see GSJournal.net Ruggeri A. 5-April-2013) :

$$1) \qquad Ma(r)_{inV} \Leftrightarrow F^{Opp}_{in\Delta VofV} \frac{\Delta V}{V}$$

whereas the E=Ma(r) is Energy, the F is a Force in opposition of elastic nature and ΔV is not a reduction of volume but represents a simple equivalence of effects better shown here below by Hooke's Law applied to the unit of volume (if we consider that the above equation describes only the case in which the mass M is subjected to gravitational pull):

1bis) $$\rho a(r)\ V = E_Y \Delta V$$

This Law only represents an equivalence of effects, between an active Force (or Potential Energy) coming in existence under gravity ($\rho a(r)V$) and opposed by Force generated by elasticity of part of the mass M, the one occupied by (Mi) and particularly a fraction $\Delta V < \Delta Vi$, a Force which to exist has to be discharged over the contact surface through contact with the (Mi) belonging to M.

We have then that to active Potential Energy $\rho a(r)V$ [kJ] (optionally reducible to mass-Energy equivalent) is opposed an elastic reaction Force inside M, $E_Y \Delta V$ which being an opposition Force has no substance but still is referred in units of Energy:

$$\rho a(r)\ V = E_Y \Delta V\ [kJ]$$

In effect the gravitational mass Force here above, in Static/Potential conditions, is just Starter Force ready to initiate transformation-degradation at any time if the mass M, which under the capacity of the Starter Force to start movement, is in conditions to move, (in that case, if M is free to move, the gravitational mass Force can start movement of freefall along the radial gravitational direction towards the centre of the M_{LGM} or if it is impeded to move it still starts elastic movement towards the centre of the M_{LGM}, which is a movement internal to M as mentioned above).

If in place of the specific mass Force $\rho a(r)$ we write the more generic σ we can rewrite the above expression in the following way:

2) $$\sigma\ V = E_Y \Delta V$$

Note: the above equation is representing Hooke's Law in terms of equivalence of effects, whereas σV is a more general expression concerning how a value of Potential Energy/Static Force inserted in M in the direction of movement through the gravitational depression or how a Force from another source or device etc… will be opposed by presence of interstitial elastic mass unloading it against a rigid surface.

The equation in 2) becomes fully operational as soon elastic movement $\Delta V/V = \varepsilon$ transforms mass-Energy belonging to M into Energy at first and successively recompresses it as a transient dm also belonging to M :

$$\sigma\ \varepsilon V = E_Y \varepsilon \Delta V \quad \text{or} \quad \sigma \Delta V = E_Y \varepsilon^2 V\ [kJ]$$

(this last result is also encompassing the gravitational relation above (which was explained in Potential terms) and is depending from internal transformation-degradation of gravitational origin from mass-energy belonging to M to Energy also belonging to M, see GSJournal.net Ruggeri A. 5-April-2013).

It must be noticed that Hooke's Law presented above in 1bis) or in 2) is in any case representing an equivalence, a value of Energy acquired by M through internal transformation-degradation of gravitational origin or trough insertion inside it of a transient amount dm of mass-Energy existing in conditions in which is ready to be delivered inside M happening through contact exercised by a device inside which

was produced and against which acts a Force in opposition of elastic origin generated by presence of interstitial mass (Mi), internal to M (Note: this Force of elastic origin according to Newton's third Law is opportunely interpreted here in the UL-UDS as having the capacity to oppose Energy intended as "active Force" released by elastic movement of M inside the gravitational field.

What must be noticed now is the way in which the phenomenon (Hooke's Law) occurs… and its relation to the other phenomena concerning Energy, as one can see that in the 1) above, reference was made to the version of the Universal Law in the UDS (UL-UDS) which had the intent to show that the phenomenon is part of a series of others, all as well truly Universal since reflects one phenomenon or a group of phenomena belonging to the Universal reality.

We now have that in the gravitational case the Energy necessary to produce movement is opportunely supplied by internal transformation-degradation of mass-Energy belonging to the mass M whose direction of movement (as active Force) is fixed along the radial line to the centre of the M_{LGM} , it is now to be noted that when Energy is supplied by an external device or by other means (internal combustion engine or electricity supply to electrical motors belonging to a car or a train etc..) the mode and the direction of movement are more open to option and not necessarily directed towards the centre of gravity of the M_{LGM}.

Nevertheless the Universal Law (UL-UDS):

$$Work_0^t = F\ \frac{V(t)}{V} \quad [kJ]$$

Ruling over these phenomena remains unaltered.

We have just shown how Hooke's Law is respecting the (UL-UDS) but now let us analyse Boyle's Law, up to now presented in the following manner:

$$p \cdot V = const$$

In the UL-UDS can be presented in the following manner (being V(t)/V=1 for t=0)

$$E_{Tot} = p_1 \cdot V_1 = p_2 V_2 \quad [kJ]$$

Intended as comparison between the same amount of Energy E_{Tot} possessed by a system in conditions relating internal compression to the volume occupied, reference is also made to the physical passage from the status p_1V_1 to p_2V_2 obtained maintaining the outside of the system at constant temperature which means that if there is insertion of Work to go from $V_1$to V_2 causing through compression increase of internal temperature an amount of Heat equivalent to Work done must be immediately released.

This theoretical reasoning undoubtedly was the process through which the Law was discovered and to this we must add the very important consideration that although the Energy of the system is remaining constant from a status to another the two states of existence are comparable in terms of degradation since from p_1 to $p_2<p_1$ whilst passage from V_1 to $V_2>V_1$ occurs the constant E_{Tot} is subjected to degradation and the phenomenon is spontaneous and occurs without external interference whereas to upgrade in the opposite direction is not easy task.

I found useful to mention this phenomenon, “the degradation to which Energy is naturally subjected through Boyle’s Law” since it will be necessary to refer to it in future.

For what regards Boyle’s Law we then have that the two states of existence of Energy concern the same amount of indestructible substance possessed by a mass of gas contained under pressure inside a volume but Energy in 2 where it went spontaneously is more degraded than in 1.

Undoubtedly Boyle studied the phenomenon through very demanding experiments also due to the fact that the instruments he used were still very inaccurate, and we can say that the results were outstanding since he was the one who opened the door to successive advances.

He could not be aware that his results opened the door to the modern Science, wherever Energy is mentioned and studied and this is due to the fact that his Law is the first example of equivalence of states of existence of Energy in potentially active or active conditions, after his Law followed Hooke's Law, the Universal Law of gravity (Newton) and the Law of equivalence of mass-Energy to Energy (Einstein) etc… all basically are regarding conditions of equivalence of Energy in different states of existence permitting comparisons between systems containing the same amount of Energy etc...

The natural phenomenon, concerning Boyle’s Law, when presented through the UL-UDS must be expressed as presence of Energy in the following manner:

$$E_{Tot} = M \cdot v^2$$

Whereas in E_{Tot} M is statistically representing the total of the atomic masses $\Sigma n \rho dV = M$ assumed to be those of a monoatomic gas occupying a volume V each of them endowed of velocity v, E_{Tot} is in kJ belonging to the atoms moving at average v speed and is opposed by Force (compression developed by the Ether/ESF inside the volume V of the box containing the gas, in which each atom moves frictionless at v speed:

$$E_{Tot} \Leftrightarrow \left(\rho \cdot v \cdot \forall\right) \frac{vV}{\forall}$$

Movement of the single atoms occurs whilst they undergoing expansion of the Energy possessed they move at v occupying a volume v times the one they would occupy in conditions of quiet.

Now if we index $p_1 = \rho v_1$ and $(v_1 V_1)_1 = V_1$ the E_{Tot} above can exist only if every single atom of M fulfils the requirement of moving at expansion/depression v of the original Energy ρv^2 and this can take place only through presence of Ether/ESF compression around the single atoms.

As consequence of presence of a field of compression around the single atoms there is a composite field of Ether/ESF inside the box of volume V, occupied by them whilst they move at v velocity.

In the process the atoms which (individually) are in possession of kinetic Energy (can do Work), exchanging their presence at a reduced velocity from v_1 to v_2 (at $p_2 < p_1$ inside a volume $V_2 > V_1$) whilst moving at v_2 are finding unchanged opposition to movement of elastic character reflected by an unchanged total value of compression of the field of Ether/ESF inside both V_1 and V_2 in which they move at no friction.

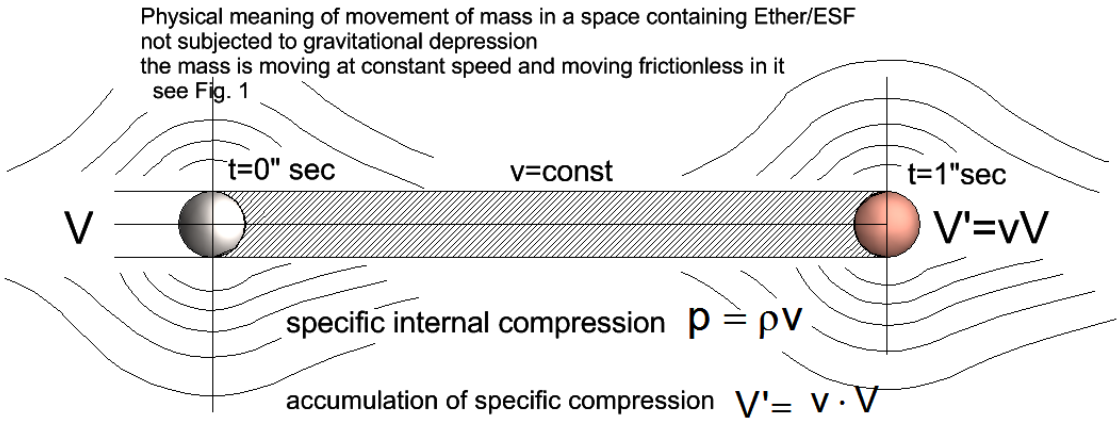


Fig 2

Total Energy
= opposed Force

$$E_{Tot} = pV' = \rho v \cdot vV = M \cdot v^2 \ [kJ]$$

Note: this example "is non gravitational" and overlooks that "non gravitational" movement observed in a Lab on Earth always takes place inside a field of Ether/ESF under gravitational depression and if presence of gravity is taken into account we are enabled to justify perturbations of the trajectories of the atoms and of their velocities

When the single atoms hit the sides of the box the field of Ether/ESF surrounding them lets them discharge contact Force whilst the elastic character by necessity is diverted in a direction opposed in the vertical plan of movement still in conditions of no friction since there is no contact between the mass of the single atoms and the internal surface of the box.

Note inside the undisturbed box, not subjected to introduction of Energy as Work or release of Work Energy as Heat we are in physical conditions which the gas can maintain forever.

Note: when the substance between the atoms is not any more the Ether/ESF but is interstitial mass (Mi) also of elastic characters, we have Hooke's Law and there is analogy with Boyle's Law if we consider that Hooke's Law can be represented through a relation between volumes under compression, but the comparison must stop here, since with Hooke we are facing an active status of existence of Energy (as substance or mass Force distributed over the volume V of the mass M) opposed by a Force (having no substance) generated in the volume Vi occupied by the interstitial mass (Mi) of elastic character existing between the atoms of M of volume V, (as above described).

The elastic phenomenon in the Potential conditions needs attention and will have to be discussed since M can be subjected to further physical phenomena of relativistic nature, due to the fact that the Potential mass Force in M has the capacity to produce natural degradation inside the atoms (in a continuous temporal basis) of mass Energy belonging to them directly into Energy in the status of Heat and dissipation of the same.

Internally to the box of volume V_1 , from $p_1=\rho v_1$ if we let gradually the gas occupy a volume $V_2>V_1$ we will physically move to $p_2=\rho v_2$ so that the internal compression

will change through “degradation of Energy character only” whilst the value of Energy will remain the same:

$$E_{Tot} \Leftrightarrow (\rho \cdot v_1) v_1 V_1 = p_1 \mathbf{V}_1$$

=

$$E_{Tot} \Leftrightarrow (\rho \cdot v_2) v_2 V_2 = p_2 \mathbf{V}_2$$

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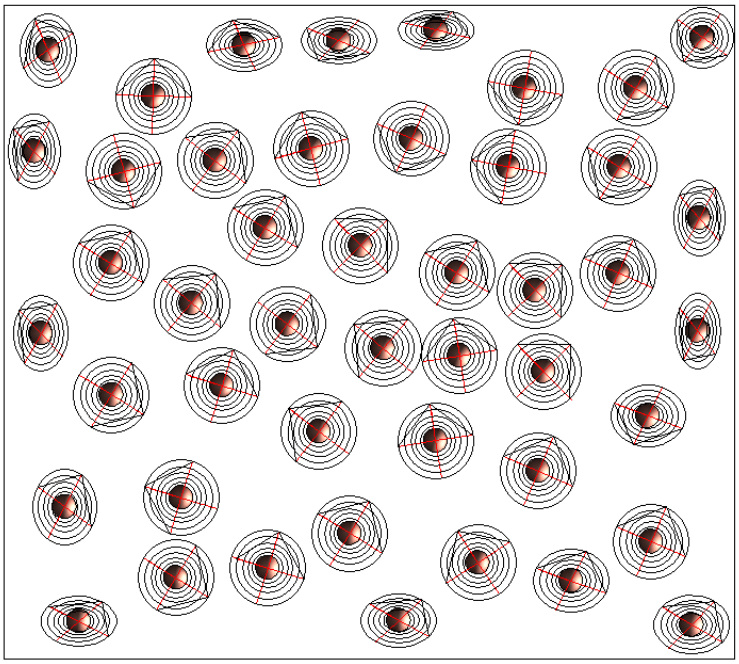
Fig. 3



The above diagram has the purpose to indicate the existence of a field of Force opposing the Energy of the single atoms which develops into a Force which compresses uniformly the box of volume V_1at a specific $p_1=\rho v_1^2$.

In the other hand with Hooke's Law

$E_{Tot} = dp\ V = \sigma V$ (Energy as substance)

Opposed by the Force:

$\sigma V = p\Delta V = E_Y \Delta V$

Or $\sigma V = E_Y \Delta V$

The above equation shows the true nature of Hooke's Law opposing to a value of Potential Energy inside a mass M a Force of elastic nature developed by presence of (Mi) in M also of Potential nature (in Hooke's Law no transformation-degradation is involved it only represents how the gravitational mass Force is opposed by interstitial mass Force (contained in ΔV) and how the Force in ΔV on its turn is opposed by contact Force.

The follow up of Hooke's Law is that since an elastic movement occurs in consequence of presence of these Forces, inside the mass M under gravitational transformation-degradation will be present an amount of Work of gravitational origin

and inside the same mass if an external active Force is applied will act an amount of Work transmitted from an external device.

Note: the explanation of the Boyle's Law and Hooke's Law as phenomena that can be related to the UL-UDS as mentioned above is made up with the purpose to point out that both Laws reflect the existence of a general principle of equivalence.
With Boyle the equivalence is between opposite Forces in the relations between equal values of Energy in different states of degradation (we have to introduce the concept that "Energy can be subjected to degradation".
With Hooke there is equivalence of effects (which according to Newton 3rd law must be of equal and opposite values) between active Energy as substance acting over the atomic entities of a mass and a Force in opposition to the Energy, acting over the interstitial elastic substance bonded to the atomic entities (relegated to a small portion of M that $\Delta V < \Delta Vi$.

1) This new approach to dynamic Science not only contains (as above described) the Laws of Boyle and of Hooke within the NEW UNIVERSAL LAW (UL-UDS) but as well contains the Universal gravitational Law (Newton) and the Law of equivalence(Einstein) ,which will be presented in part 2 of this paper, and furthermore will permit:

2) Description of a very interesting phenomenon (of Universal Nature, whose effects are relevant in large gravitational Masses of the size of Stars) taking place inside the unit of volume occupied by the mass of density ρ under the effect of the gravitational depression, consisting of continuous transformation-degradation in time producing output from them of Heat and dissipation.
It will be discussed as a further application of the UL-UDS.

3) Further on Precession phenomena of gravitational nature and of relativistic nature will be also discussed (still) on the basis of the UL-UDS

4) Presentation of a range of Relativistic problems will be also undertaken trough the use of the UL-UDS (time differences between systems in relative movement etc…)

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