

4 November 2008

## On Mathematical Transformations and physical transformations-degradations and where mathematic is failing

Mathematical transformation cannot be proposed to justify a physical transformation since Mathematic cannot represent in full the continuous variability of the physical reality, and is just a mean to freeze a possible aspect of the physical world (see [Ruggeri11](#) page 4) since whereas in mathematic we use the equal sign in physics that sign intends to point the indestructibility of the mass-energy and of its spin character, but remains limited and insufficient when is necessary to explain the added concept of transformation-degradation along an interval of time.

A distinction must therefore be made when talking about physical transformation since, from the very beginning, the Classic Mechanic (CM) was generated in error through the generalization of the equivalence between Work and Kinetic Energy and when successively was faced with the principle of equivalence of kinetic energy and heat, (as a form of energy), CM was subjected to a dilemma which still at present has not been satisfactorily solved, though the principle of equivalence between energy (in the known existing forms) available to CM, and mass-energy, as enunciated by Einstein, gave the basis for the solution.

The problem arose from the denial of the presence of the Ether/ESF in the universal reality.

The new development, in the terms represented in the Universal Dynamic Science (UDS), uses the revolutionary concept that the Ether/ESF or shortly ESF is the pristine pure substance (filling the Euclidean space) and is at the base of the universal reality.

Whereas the universal reality comes to exist thanks to the natural unstoppable chain of transformations-degradations to which the ESF is subjected following a principle of cause and effect that ends in dissipation and dispersion.

The mathematical transformations as they are made available in the calculus theory represent a treatment subjecting the continuous functions under consideration to inversion of effects consisting of the application of a

transformation consisting of a derivative to which can be opposed the inverse transformation consisting of an integral.

$$\int_A^B dF(x) = F(B) - F(A)$$

Or:

$$\int dF(x) = F(x) + \text{const}$$

Equating work and kinetic energy developed under gravitational conditions permitted the use of the calculus inversions and led to the perception that the following mathematical representation was valid also in the physical discipline:

$$\int_0^v M d(v^2) = \int_0^{\Delta r} F dr$$

it was found that the kinetic energy possessed by a physical mass object falling freely from A to B was equivalent to the work necessary to bring it back from B to A, but something was missing since that physical mass falling freely from A to B, when reaching B was in movement and resulted endowed of kinetic energy and in that condition could not be easily brought back from B to A.

Therefore the two operations could not be reconciled since application of work from B to A was against gravity requiring the lifting of the body in question through cession of work coming from an external source to it, and to have the said body in conditions of stillness in B another operation had to be performed, i.e. the kinetic energy had to be transformed through friction into heat which could not be retained by the physical mass and was lost as dissipation.

The consequence of this observation is that the above mathematical relation did not represent physical continuity.

Now this transformation into heat and successive dissipation, is degradation since the heat is a loss that the object mass cannot recover and if we want to bring the object mass back from B (where we suppose that since it has lost all the kinetic energy which has been transformed into heat and dissipation, it is present in conditions of quiet) to A, we need to supply externally to it a fresh amount of energy equal to the heat (in units of energy) which was permanently lost.

At this point one must ask: “ what makes the present scientific perception talk of reversibility?” since every time to maintain the physical continuity in the physical object under observation we have to bring it from A to B under the effect of gravity whilst we dissipate the kinetic energy into Heat and once reached B in conditions of quiet (not having kinetic energy which has been totally dissipated), if we want to return the physical object in A, we have to supply work through an

external agent in the same amount of the loss of kinetic energy transformed into heat.

Since every time we want to run that cycle (from A to B and successively from B to A) we have to obtain the kinetic energy through gravitational transformation, dissipate it and supply an amount of work from an external source equal to the amount lost through dissipation, I do not see how the thesis of reversibility of a physical transformation in that cycle can be sustained.

The proposition then works in terms of mathematics but is preposterous and unsustainable in physical terms.

Let us now transpose the exercise to the pendulum or alternatively to the Borehole and try to obtain a conclusive result in regard of the physical effect in the physical mass whilst is in a movement that to superficial observation appears to produce reversibility, since now once reached a maximum velocity (both in the pendulum and in the Borehole) in all appearance the kinetic energy seems to be retransformed into what is presently called energy of position (potential energy).

Also in this case, the definition of potential energy transformed into kinetic energy and thereafter recovered along a reversible cycle of transformation is a mental construct of mathematical nature but has no validity if the physical conditions are well scrutinized, since when going from A to B (in the pendulum and in the Borehole) the physical mass object is undergoing an internal physical transformation-degradation of mass-energy equivalent from  $M_{RM}$  (neutronic mass-energy) into inertial equivalent  $M_{ESCE}$  of the kinetic energy developed, connected through concatenation of events to the successive physical transformation-degradation of  $M_{ESCE}$  from B to A.

At this point, whilst all is well in the mathematical world, all is not well in the physical world, since a physical transformation is by definition also associated to degradation and a degradation constitutes an irreversible phenomenon (in terms of the first principle of thermodynamics extended to all the physical phenomena) therefore, when in gravitational conditions, inside the physical mass in movement (in the pendulum or in the borehole) the neutronic mass-energy is transformed into inertial mass-energy equivalent and measurable as kinetic energy, developed along the movement from A to B the inertial mass-energy cannot be retransformed into neutronic m-e during the movement from B to A, since it would be an upgrade and would go against the first principle of thermodynamics.

The gravitational transformation of the inertial m-e existing in B inside the physical mass whilst it proceeds against the gravitational field from B to a level corresponding to A is also transformation-degradation, and now the inertial mass-energy  $M_{ESCE}$  (representing degradation of the  $M_{RM}$ ) contained inside the physical mass is subjected to an inversion of the previous "gravitational" transformation since the movement takes place in direction opposite to the one in conditions of fall (see fig 1 and 2 below).

The inertial mass-energy (equivalent to  $M_{ESCE}$ ) which was released by the neutronic mass is now reabsorbed into a status similar to the neutronic mass but twice degraded (since subjected to a transformation from A to B and successive transformation from B to A).

The original neutronic mass has returned to be gravitational and inertial but could not reassemble in the same fashion the neutrons do, instead has recovered the internally directed direction of spin of the mass neutronic, but in haphazard fashion, it constitutes now the m-e binding together the neutrons and the protons, is not mass-energy  $M_{RM}$  but has become m-e  $M_{ESCM}$  having characters similar to the gravitational mass of the neutrons and protons and taking part to the phenomenon of absorption of the ESF, since now is again gravitational.

The consequences for the extant theorems accepting reversibility in gravitational dynamic conditions are enormous since, in principle, they result falsified.

Nevertheless if the case under observation is encompassing a short distance of freefall, AB, the transformation is of small value in terms of energy, and the equivalent neutronic internal transformation over the physical gravitational mass is of such extremely small value in terms of physical mass-energy that the energy involved can be attributed to an invariable physical mass (disregarding in this way the internal transformation of mass-energy which is the cause of movement).

This is the essence of CM and this is the reason why today in most cases calculations especially in the civil engineering field can still be carried on considering an invariable mass.

The UDS can now be seen as the natural expansion of the CM.

Let me now give an example of application of the UDS and of its importance in terms of understanding of the physical problems.

In the following example I will show that the formulation presented on the theory of elasticity results incomprehensible if the basic formula is interpreted through the CM.

We have that the basic relation in theory of elasticity is:

$$\sigma = \varepsilon E_K$$

Where  $\sigma$  is presently intended to be a contact Force over an unit of surface,  $\varepsilon$  is a coefficient of deformation of value  $0 < \varepsilon < 1$  (a fraction of  $E_K$  therefore a pure number) and  $E_K$  a modulus of cubic compression in  $\text{kJ/m}^3$  representing the maximum energy that the unit of volume can absorb through deformation and obtained by extrapolation of linear deformation over a very limited range of  $\varepsilon$ ,  $0 < \varepsilon \ll 1$ .

Surely if one wants physical conformity,  $\sigma$  must be also expressed in  $\text{kJ/m}^3$  but then only in the UDS there is representation for  $\sigma$  since in the UDS can be justified as a total Force afflicting an unit of volume and having directionality, and is not a contact Force, also endowed of directionality, impressed over an unit of surface.

The difference is based on equivocal interpretation since at present we have the obviously wrong presentation:

$$\left[ 1) \quad \sigma \left[ \frac{\text{kN}}{\text{m}^2} \right] = \varepsilon E_k \left[ \frac{\text{kJ}}{\text{m}^3} \right] \right]$$

The above is a formulation that has no physical justification and represents a mathematic-geometric misuse of a physical condition, which was permitted to become the basic axiom of the elasticity theory with the contact Force  $\sigma$  acting over the unit of surface of a purely geometric, incompressible, cubic unit of volume (a platonic object and therefore a non physical entity), whose "limit of rupture" was empirically fixed by experimentation.

$E_k$  in the other hand is a value of maximum absorption of mass-energy which is linearly associated to  $\varepsilon$  presumed to have validity only for  $0 \sim \varepsilon \ll 1$  since the value of  $\sigma$  at failure, (when the  $\sigma$  is supposed to be applied to a physical mass) is always a lot smaller than the  $E_k$  attributed to that mass, (the material under examination will never absorb a value  $E_k$ , since it will break much earlier).

The true formulation is :

$$2) \quad \sigma \left[ \frac{\text{kJ}}{\text{m}^3} \right] = \varepsilon E_k \left[ \frac{\text{kJ}}{\text{m}^3} \right]$$

For  $0 < \varepsilon \ll 1$

And the passage:  $\sigma \text{ (kN m)} / (\text{m}^2 \text{ m})$  has reason to be in mathematics but not in physics since its adoption gives different physical meaning to the dimensional ratio in 2) due to the fact that in 1) the  $\sigma$  is a directional contact Force applied over the unit of surface and in 2) is a directional total Force applied over the unit of volume (is a mass Force).

As it is at present in many engineering text books and manuals, the theory of elasticity uses an  $E_k$  in  $\text{kN/m}^2$  and ignoring the problem pretends to have overcome the impasse, whereas it has produced a situation without hope of obtaining physical advances, since it gives a relation which depends from a geometric invariable surface part of an incompressible volume, whereas should depend from a volume containing substance whose density increases with compression since compression depends from insertion of mass-energy endowed of unidirectional Spin inside the volume compressed.

The conclusion is that the theory of elasticity represents an approximation for objects of nature homogeneous and isotropic whose elasticity depends purely from atomic bonds, that are subject to rupture for small values of  $\varepsilon$ , and cannot be relied when the total Force  $\sigma$ , applied, affects the surfaces of the atoms

through compression, applied in the direction of  $\sigma$  provided we assume non deformability through adjustment of compression in the other directions since in that case the  $E_K$  tends to increase indefinitely.

In simple terms a unit of volume of physical gravitational mass, inside a gravitational mass, is not subjected to structural collapse

Note: this last condition of indefinite insertion of mass-energy inside a volume, through compression, finds a natural limit in the enormous but finite capacity that a Total Force has to be inserted inside an Euclidean Volume occupied by a physical mass.

Note: it is well known that the theory of elasticity represents a “conventional” method for the evaluation of the safety of structures, and other methods sometimes of more dubious validity (especially when structures are subjected to mobile loads and therefore have elements under tribulation) have been developed.

Note: I will come back more extensively on this interesting topic, since I have noticed the necessity that the basics of theory of elasticity and allied theories need to be subjected to more intense criticism.

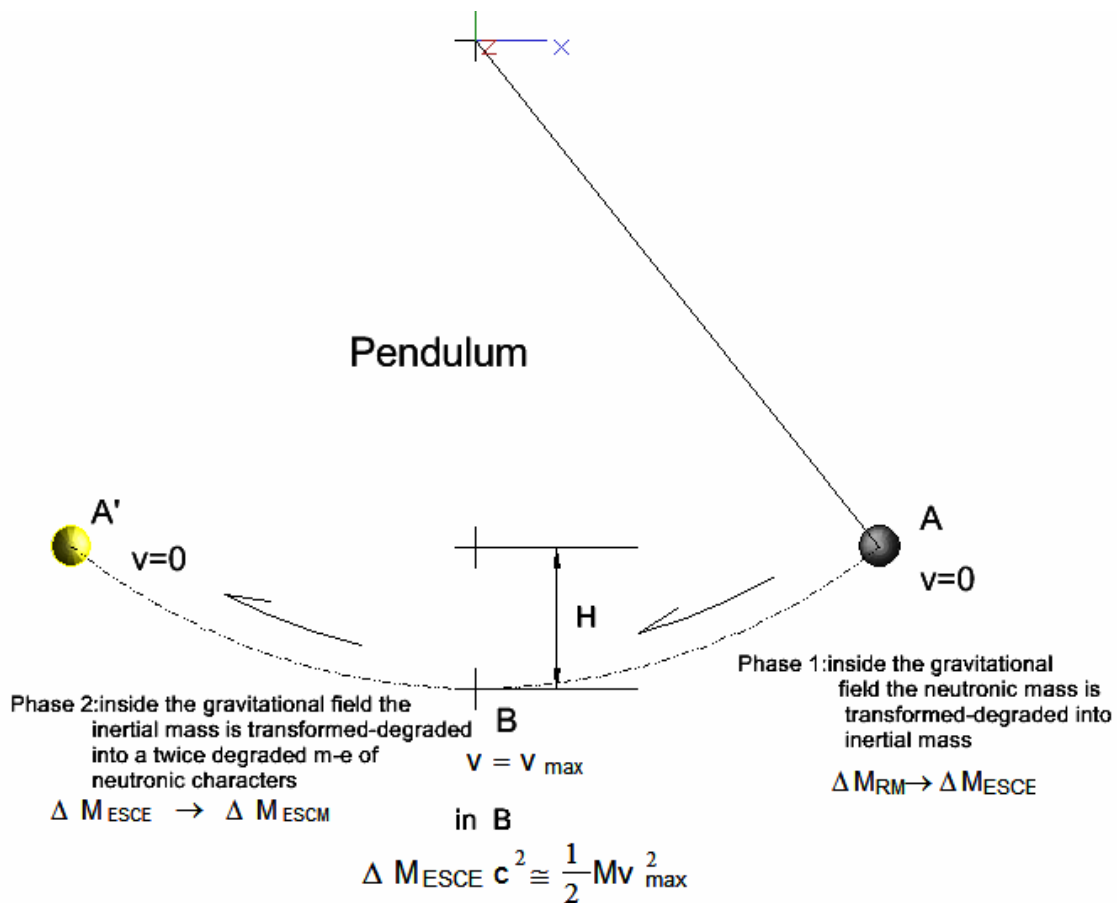


Figure 1

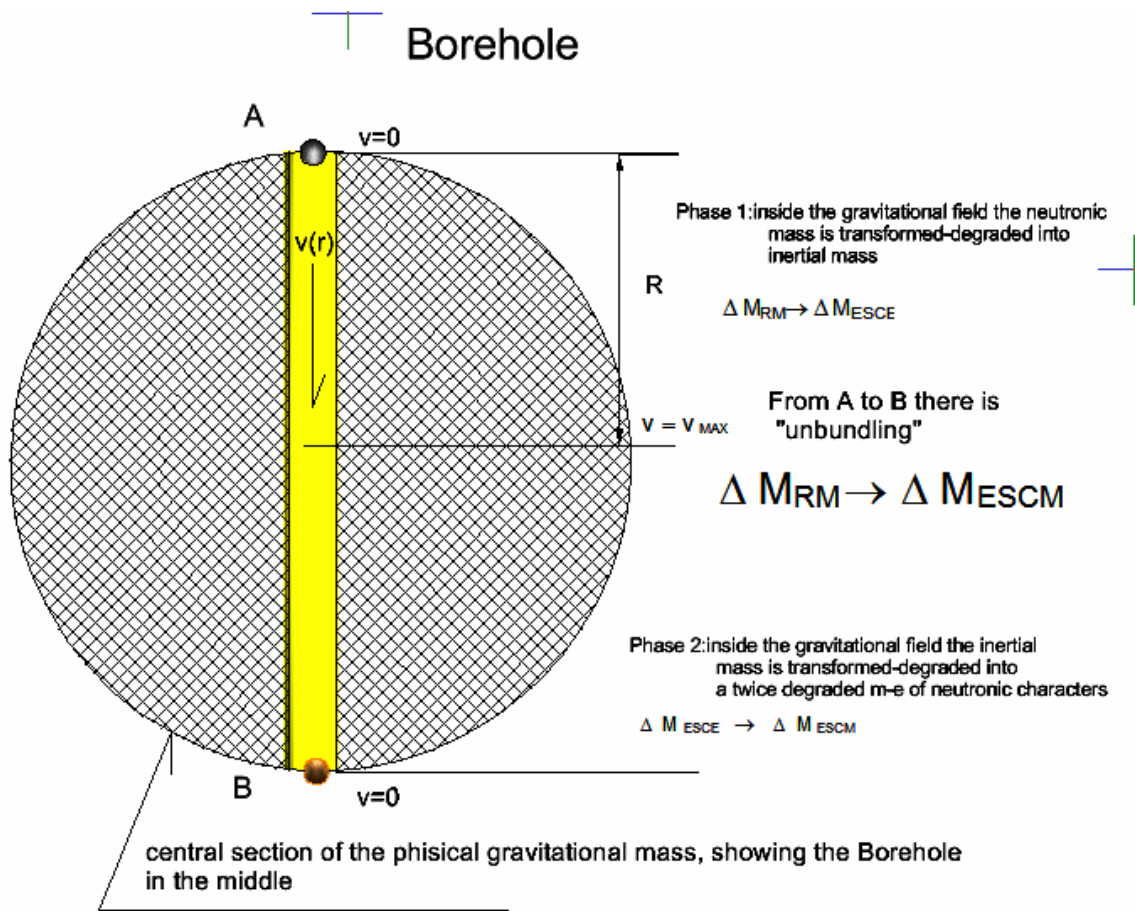


Figure 2