

The universal Feedback function within many areas of science

V1.9

Abstract: Here we will explore the feedback principle in nature and proof it to be a very important universal useful science principle applying to **all** disciplines of science!

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One of the most famous **energy saturation-feed-back principle** is contained within the H. Lorentz transform: $1-V^2/C^2$ which is **pinching-off**, setting a **glass ceiling-limit** to the inertial mass motion **energy** / acceleration progression exerted from a **fixed-point** at the speed of light **c**; wherein **fixed-point** means that a **large** mass entity is providing an **apparent backrest** which is receiving a “**third law**” **unnoticeable-unmeasurable-small** kinetic-energy-momentum **reaction!** This third law in H. Hertz’s energy form is effectively **re-**formulating Newton’s third law expressed as: $e/E=m/M$; wherein **the total energy is: $E_{total}=E+e$; $E+e$ is the kinetic energy sum in mutual-reciprocal third law motion derived from one single force **F**.**

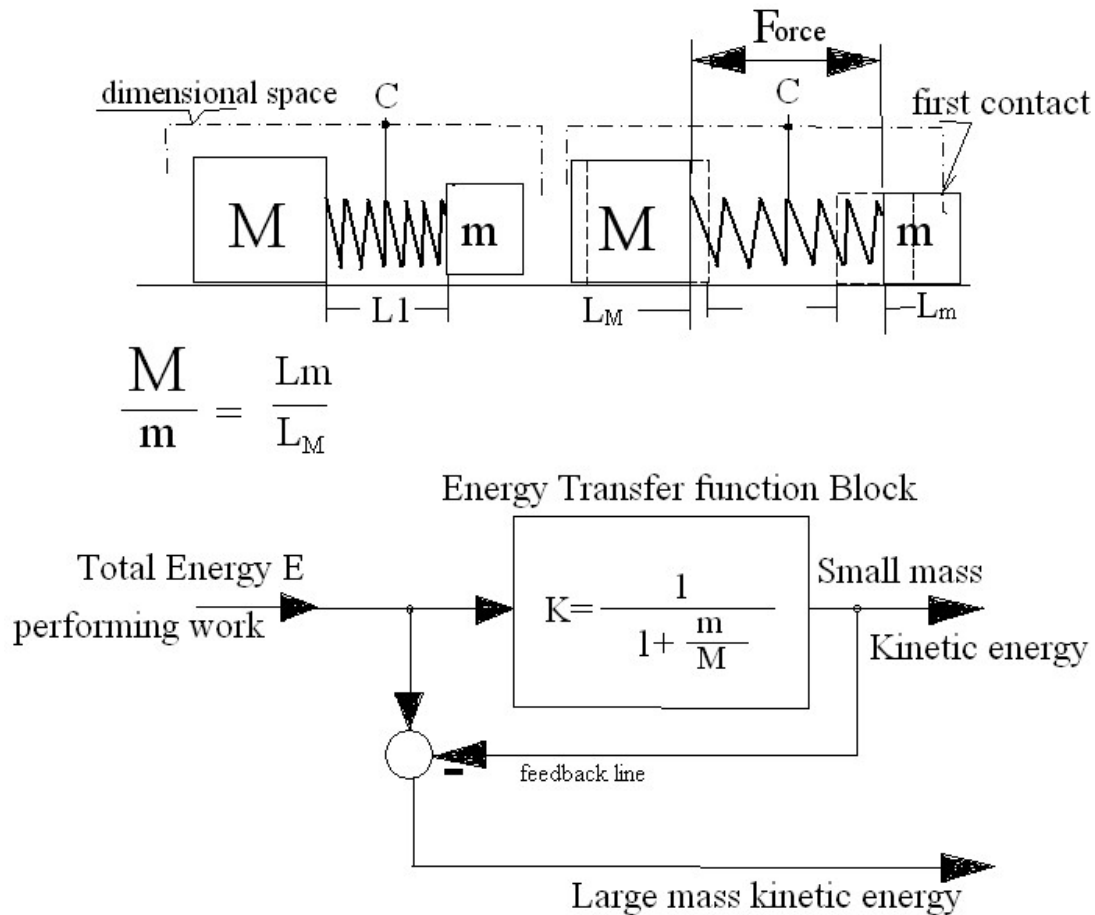
The reciprocal large **Mass acceleration** is: $a=F/M$;

And the small **mass acceleration** is: $a=F/m$; **a** is **MUCH** larger \gg than $a=F/M$; for the **same** force magnitude **F**, accordingly, the feedback function formula is:

$$e_{small,mass}=E_{total}/((m/M)+1),$$

this is the very important **fundamental feed back** function within Newton’s third Law, wherein the reciprocal mass magnitude relation “**m/M**” acts as an exact-smooth **analog** computer without **numeric-fractional** steps! Here is the picture depicting the third law feedback principle within a two

unequal mass system operated by a central compressed spring in understandable block flow diagram:



The $K=1/(1+m/M)$ multiplication-constant is the governing constant which governs the **distribution** of the input-supply energy consisting of the opposing mass accelerations and opposing distance-displacements disposing into the two unequal mass blocks! This is consistent with Galileo-Huygens-Leibniz: $E_{gravity} = mgh$,

$E_{general} = m \cdot a \cdot X_{distance-displacement}$. This means, in **general terms**: The third Law inertial mass motion: The difference in reciprocal **mass** magnitudes translate into a proportional difference in reciprocal velocities: $v_M < v_m$, $M > m$, $v_M < v_m$.

And, correspondingly, also a difference in accelerated length per equal time intervals: $m/M = s_M / s_m$, wherein S is the distance per time interval! Consequently, because $E_{\text{energy}} = F * s_{\text{distance}}$; we also receive a reciprocal energy distribution of the input energy according to the mass ratios: $m/M = e_M / E_m$!

For **example**: A mechanical spring input energy of 3 Newton-meter will mutually-reciprocally apply **2** Newton-meter energy into a $m=1$ Kg relative smaller mass and **1** Newton-meter energy into a larger $M=2$ Kg mass! At the same time, when this feedback system operates within an isolated-box system, the smaller 1kg mass having a 2 Newton-meter kinetic energy and correspondingly double the velocity in comparison to the large 2Kg mass **will** impact the isolates system boundary-box-wall **first before the large mass M obtains impact**; this principle is evident in the diagram picture because $a = F/m = F/1$ is **LARGER >>** than $a = F/M = F/2$! This impact **delay timing** is an **important** design feature-factor of Inertial Propulsion operating in combined angular-rotational strait line motion! In additon to the two input parameter of the third law mutual-simultaneous reciprocal motion can-should be formulate with an average velocity instead of the usual **2** devisor as follows: **ENERGY = Fs = mdV²/2 = ~mdVV_{average}**, this is because: $F = mdV/t$, $V_{\text{average}} = s/t$, $t = s/V_{\text{average}}$; **accordingly**, energy-work is: **Fs = mdVV_{average}!** This average speed construct is a powerful tool for capturing non-uniform motion together with the fast speed timing difference of simultaneous mutual reciprocal angular-rotational motion having a difference in reciprocal mass-moment of inertia magnitudes having energy **concentration** into the center of the total-combined masses, as presented and Fully explained in the author's book: "**Inertial Propulsion and you thought it is impossible**" On Amazon.com, Amazon.de book section!

Important, the energy flow direction pointers can be reversed into a **combination** of energy flows having the same governing **K** multiplication-factor!

This very important third law in the energy form is also applying to the **energy flow** within rockets, wherein the rocket fuel-mass-energy flow per time is:

$dP = dM * f_{\text{fuel-energy-mass-factor}} / dt$ causing a continuous **apparent** change in the **remaining** rocket mass $M - dM = M_{\text{remain}}$ for the **root** cause energy packet dE needs

to accelerate $a=F/M_{\text{remain}}$, during each dt time interval; this is an **apparent-unreal** shrinking-effect of mass within the third law type expulsion-separation of masses, wherein **importantly** the total mass-sum and the total energy sum is constant, conserved and still keeps existing after the fiery-rocket expulsion. The feedback principle is also the working principle of James Watt early-important mechanical **centrifugal-force** governor which is pinching off the pneumatic supply pressure at the maximum centrifugal force, making pneumatic machine-speed automation possible!

This third law in the energy realm relation is **reinforcing** Hertz's very important momentum / energy side by side view and also is the important first fundamental principle of the authors Inertial Propulsion patents, wherein we have to include-reconsider furthermore the science shunted-hidden **rotational** motion **projected** onto straight line motion, the rotational-angular **time delays** to receive the actual **full/average** third law in energy form **reaction-action** and the **directional** transporting-shifting-displacement of the gyro stored potential angular energy without any additional reaction in relation to the **substantial** rotational-angular energy stores within the gyro-flywheel. This force-reaction immunity of the gyro is the functional principle of Huygens ship chronometer clock design-idea, as presented in the Authors time measurement paper!

Furthermore, this presented feedback system principle is immensely important, sometimes unnoticeable-hidden throughout the whole of science and could be perhaps the **most** important principle in science ever! For example: In Electrodynamics, the current carrying conductor within a magnetic field receives the **very first original** mechanical motivating force:

F=**B**_{magnetic} **L**_{Length,conductor} **Current**_{Amp,flow}; while at the very first instant an actual **motion** of the conductor occurs, an opposing BACK-VOLTAGE is generated-induced into the conductor circuit opposing-simultaneously reducing the first original electrical current. This is the important **feedback** principle within the DC motor-Generator limiting-pinching off the top the available angular speed of the motor! This principle is also observable in mechanical Amperage meters employing a **movable** coil within a permanent magnet field wherein the motion of the coil-amperage-pointer is **painfully** slow in comparison to the miniscule coil

mass and return spring restoring force! The Electrical motor-generator first original mechanical force principle is also used by the Author in his Inertial Propulsion Patent and it reinforces that the energy flow is the **first-original root** cause of mechanical inertial mass motion!

For Inertial Propulsion it is **very** important that in angular-rotational mutual-reciprocal moment of inertia systems that the angular-rotational kinetic energy **concentrates** in an **quadratic** progression within the smaller moment of inertial, because:

$$I_{\text{Large}} / I_{\text{small}} = I_{\text{small}} \omega_{\text{small}}^2 / I_{\text{Large}} \omega_{\text{Large}}^2$$
 ; please view the evidence on : YOUTUBE, ggutsche1,p1100007

For biology to step into the line of the feedback principle: Charles **Darwin's** imensely important biological evolution of species can be traced to this feedback principle; wherein he argued that: When a creature bearing an advantageous trait in food gathering, dominance, survival or reproduction is contributing its genetic traits exponentially into the genetic makeup of a group of individuals, because of this presented important feedback principle! There is evidence today, that this feedback principle was possibly known and practiced by late stone-age farmers already for animal husbandry and also lately identified in central European late stone-age human burials within the Oetzie-Iceman **era** predating the Egyptian pyramid era by a millennium. This surprisingly very early long distance female pairing practice suggest the use of wheeled animal drawn carriages, watercrafts and communications. These selective female pairing practices were identified by genetic-molecular scientist examining these burial skeletal remains being in line for reaching-practicing a large distance-area range of genetic breeding-selection advantages! On the other hand perhaps, late stone age people already had knowledge to recognize that destructive **in-breeding** invokes a **negative** feedback-system destroying-deluting the genetic makeup! Or was it a cultural function of the early society as the whole? Or was it a combined function of common sense logic invoked by intelligence causing this selective-preferential pairing practises? Perhaps, it was combination of intelligent reasoning, keen observation and good luck. These human pairing issues are, of course, the subject of many legends: Like the Tristan-Isolde, Siegfried-Brunhilda pairing legends and

the most famous-momentous Trojan-Hektor-Helena pairing legend! Human genetics are, of course, the most important aspect of these pairing issues! The latest archeology-molecular reality shows how imensely important **feedback** plays in the rise of the human species-intellegence!

In physical-mechanical sciences, **feedback** is essental for maximizing automatic processes using computer algorithms. This feedback principle use-application is deep-prevalent-universal, wherein the telltale math signature is the:

$1-A^2/B^2$, $1+m/M$ algebraic form!