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ENERGY OF MACHINES - ADDENDUM

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INTRODUCTION

This paper is with reference to my earlier paper Energy of Machines (Reference 1) which forms the background to this paper. The other point to note is that (which also forms the background to this paper) is Einstein's surmises on Grand theory of Energy in the Universe which is as follows -Einstein was working on the inter-relationships of different forms of energy such as potential energy, kinetic energy, energy lost due to friction, electric energy, magnetic energy, sound energy, energy due to light etc. and whether this could be expressed by means of a simple equation – his surmise was that all these energies were inter-related and could be expressed by means of a suitable expression/equation which he could not formulate. Einstein died while he was still working on this and this remained as one of last pieces of **unsolved** mysteries according to him. My theory as outlined in this paper could ***possibly*** lead to an equation for Energy though there is no conclusive evidence for the same. It merely lays the theoretical foundation for such a theory if it exists. Some assumptions have been made in the hope for finding a solution to Einstein's surmises at the very least this paper will at least lay the foundation for finding the Energy of Machines/Objects having certain known characteristics/properties in a new light and possibly set a new standard for Measurement of Machines/Devices having such characteristics/properties.

Energy of Machines:

We know from the paper the paper on Energy of Machines (Reference 1) that -

Total Energy of the machine/device =

$= 1/2x((n1+ n2+ n3\ldots+nn)/n)x(\Delta nj/\Delta tj)^2+(n1+n2..+nn)/n\ x((nj/tj)-(nj+\Delta nj)/(tj+\Delta tj))/(\Delta tj)\ x\ n_i$

Where n1, n2 …nn are the n samples taken randomly for a variable in time t

$\Delta nj/\Delta tj$ is the rate of change for variable n (jth sample) at time tj

$((nj/tj)-(nj+\Delta nj)/(tj+\Delta tj))/(\Delta tj)$ is the acceleration of the variable n (jth sample) at time

tj and n_i is the variable (jth sample) at a time tj

But what if there are k variables for a machine/device. We know from statistics that for k variables the geometric mean of the k variables is the mean for the k variables for the device. Hence extrapolating this concept to mass, velocity, acceleration and height we get –

If $((n11 + n12 + n13 \ldots+n1n_1)/n_1) = m1$ is the mean for variable 1 for n_1 samples, similarly,

$((n21 + n22 + n23 \ldots+n2n_2)/n_2) = m2$ is the mean for variable 2, for n_2 samples, hence

$\ldots((nk1 + nk2 + nk3 \ldots+nkn_k)/n_k) = mk$ is the mean for variable k, for n_k samples

Now mean mass $\underline{m}k = (m1 \times m2 \times \ldots\ldots mk)^{1/k}$

Similarly mean velocity would be $\underline{v}k= (v1j_1 \times v2j_2 \times \ldots.vkj_k)^{1/k}$

Where $vkj = (\Delta nkj_k/\Delta tkj_k)$ for the j_k th sample for the kth variable

Also acceleration $\underline{a}k = (a1j_1 \times a2j_2 \times akj_k)^{1/k}$

Where $akj=((nkj_k/tkj_k)-(nkj_k+\Delta nkj_k)/(tkj_k+\Delta tkj_k))/(\Delta tkj_k)$ for the j_k th sample for the kth Variable

and

$\underline{n}kj = (n1j_1 \times n2j_2 \times n3j_3 \times \ldots\ldots..\times nkj_k)^{1/k}$

where

$\underline{n}kj_k$ is the mean for k variables and their corresponding samples $n1j_1$, $n2j_2$ …nkj_k (j_k th sample of kth variable) at a particular moment of time tkj_k

N.B. We cannot take time as the geometric mean time as we desire to find the total energy at a particular time; hence time has to be invariant for calculating the mean velocity and mean acceleration which we assume are variable (just as in Newtonian mechanics). Also we assume that the mass for an object remains a constant as in Newtonian mechanics. But for calculating the potential energy again height ($\underline{n}kj$) is a variable again as per Newtonian mechanics. We assume that the object is in hypothetical motion and is either spewing out the samples (nkj_k) for the k variables or characteristics it possesses or is at a hypothetical standstill with Total energy equal to zero.

Therefore we get,

Total Energy of a machine/device = **$Ek = ½ \times \underline{m}k \times (\underline{v}k)^2 + \underline{m}k \times \underline{a}k \times \underline{n}kj$**

CONCLUSION, SUMMARY AND SCOPE FOR FURTHER RESEARCH

If the integral is taken for $k=1$ to ∞, and $j = 1$ to ∞ => infinite variables and infinite samples of all the infinite variables we ***might*** get the Total energy of a device/machine/object which Einstein was trying to formulate and or the relationship between the geometric mean mass of these variables, its geometric mean velocity, its geometric mean acceleration, for a given geometric mean value of the variables at a given time $\underline{t}kj_k$. Einstein's surmise I believe was correct in the sense that energy gets converted from one form to another, but he was unable to put a generic relationship between the different forms of energy and their inter-relationship which this integral might be able to conclude via the different variables which are nothing but characteristics/properties of the energies of the object/device.

N.B. Einstein in his famous equation, $E = mc^2$ said that as velocity approaches speed of light mass m gets converted into energy, in our equation since mass, velocity, acceleration and height are functions of the k variables which are nothing but energy properties/characteristics of the object . Hence, we are able to mention the energy in terms of the energy properties/characteristics such as temperature, humidity, number of instructions executed per second and other characteristics/properties for different objects such as an oven, computer, refrigerator etc. Also we have assumed mass $\underline{m}k$ to be a constant as per Newtonian mechanics, extrapolating on the basis of Einstein's hypothesis we can assume that our constant mass mk may also become variable and converted into energy at a high hypothetical speed, acceleration for our objects. It would be interesting to find at what speed/acceleration at which our object's constant mass becomes energy for a category of objects or for a given object.

REFERENCES

1. Energy of machines by Hatim Kanpurwala - ISSN 2277-1174 – Abhinav Journal – May 2013