A further analysis of the possible phenomenon of energy changing dimension using the generalised Lagrangian operator

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Abstract

The main assumption here is that a rotation through any angle(s) is a change in dimension. Also that operating on the structure of energy can alter the space of dimension. The matrix operator Q is related to the choice function E or B. Using ideas from previous papers the very structure of a particle is a logical entity and here is represented by matrices. A change in energy is a change in the number of variables of space(time). This may mean that the number of rows in the structure of a particle is a redundant energy, contributing to entropy.

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Introduction: Often the most interesting math is done on nxn matrices and this implies a symmetric structure of particles. A simple example of the rotation operator P will be given. Su(n) matrices are crucial in quantum mechanics. Here there may be further connections between angular momentum or energy and the very structure of logic – a possible path to the connection between operators and the structure of space – time.

The first result is simply applying a rotation operator to produce an entropy. The second is an operator which manipulates the number of columns (hence spatial – temporal dimensions) and rows in a matrix / tensor. Here mostly matrices are used.

Results: The basic principle of the first result is that of a rotation operator. For a simple rotation we have for matrices X and X':

X' = P X.

Writing this in terms of Anti – information: That is A = X-BX where B is a choice function such that this implies Information – logic (where logic is BX) , we have:

X' – PX = A

Now to write as an entropy dS:

dS = A/x

Where 1/x is an inversion (duality). In matrix notation:

$$dS_B = \{\, [X'] - B\, [X]\}Y^{-1}$$

$$dS_P = \frac{1}{x}\{[X'] - P[X]\}$$

NB the two inverted terms are related. Also energy is an inverse length. Now equating the fraction A/x as entropy. That is

$$E\_k = T\, dS$$

Here :

$$E_K\ is\ used\ for\ energy\ and\ E\ for\ choice. (mistake\ in\ previous\ paper.)$$

If dS does not change, for a constant temperature then the energy does not change. Thus for total Entropy:

$$dS = dS_B \pm dS_P$$

Applying the inversion 1/x we have a new matrix:

$$X'' - BX'$$

Such that this can be written as the characteristic equation

$$X - \lambda I$$

We may be able to construe P and B as frequency f and period T so that :

$$x = vt$$

And for a constant velocity:

$$P = B = f\ \ but\ \ P\,P^{-1} = I$$

Now a zero change in energy is a zero change in the structure.

$$dS_B = dS_P = 0$$

But solutions exist for the matrices only if.

$$\det(X - \lambda I) = 0$$

So applying operators gives Lambda terms.

NB for no rotation we have:

$$P = B = I\ \ so\ that\ \ X' = I\,X$$

And this implies no rotation means no change in energy. (unless a dimension is changed – see later) Also B can be construed as the number of bits required (see entropy as logarithm)

Also we may be able to write entropy as the number of paths through the matrix/ tensor:

$$dS = \frac{N - BN}{x^n x^{n'}}$$

Thus :

$$dS = \frac{N - BN}{x^n x^{n'}} = \frac{E}{T} = \frac{m x_i f_j^2}{T}$$

Using an iteration:

$$E_{i+1} = E_i(X' - PX)Y^{-1}$$

And again energy as an inverse length such as:

$$E_k = \frac{hc}{x}$$

Again for rotations:

$$E_k = \frac{1}{2}\, m\, r^2 ø^{2f^2}$$

This sums up a possible mechanism - with further analysis – of energy changing dimension (rotation). We now look at an operator :

$$Q \;\; and \;\; Q^T$$

Which adds or subtracts elements:

Here:

$$Q^T\, X_{ij} = X_{ij} \pm P_{KL} = \;\; A_{KL}$$

And:

$$Q\, A_{KL} = A_{KL} \pm P_{KL} = X_{ij}$$

Such that, for example - for a matrix:

$$A_{KL} =$$

a_11 a_12 a_13

Q a_21……………..

a_31 a_32 a_33

and for matrix:

$$P_{KL} =$$

- - P_13
- - P_23

P-31 P_32 P_33

We have:

$$X_{ij}$$

= a_11 a_12

. a_21 a_22

Such that elements are removed or added to produce a matrix of different size. Now this relates to the Generalised Lagrangian operator as:

$$[E \pm B]\left\{X_{ij} \pm P_{KL}\right\} = A_{KL}$$

Where:

$$[E \pm B] \to Q^T$$

And

$$[E \pm B] \to \quad Q$$

And:

$$[E \pm B]\{\, A_{KL} \pm P_{KL\}} = \quad X_{ij}$$

Here we are primarily concerned with the number of columns n in an mxn matrix – that is the dimension of space (time) . ie j and L but we treat the extra (or subtracted) rows as a change in entropy , hence energy.

Thus for a given volume:

$$x^n x^{n'}$$

There can be hidden information/energy – thus applying:

$$Q \;\; and \;\; Q^T$$

We can change either energy/ dimensions or both.

$$Q \to \quad Q^T \to [E \pm B]\{P, C, I, A \dots\}$$

(see previous papers)

Now, for example with a change in time:

$$\frac{\partial}{\boldsymbol{\partial t}}[\boldsymbol{E} \pm \boldsymbol{B}]\{\boldsymbol{X_{ij}} \pm \boldsymbol{P_{KL}}\} = \boldsymbol{X_{ij}}$$

And:

$$\frac{\partial}{\boldsymbol{\partial t}}[E \pm B]\{A_{KL} \pm P_{KL}\} = A_{KL}$$

Where the logic can be extended - thus a time rate of change returns the original matrix. NB the implications.

Also for a further analysis:

$$\frac{\partial}{\boldsymbol{\partial t}} E_k \Delta t \to \frac{\boldsymbol{\partial}}{\boldsymbol{\partial t}}[\boldsymbol{E} \pm \boldsymbol{B}]\{\boldsymbol{X_{ij}} + \quad \boldsymbol{P_{KL}}\}\boldsymbol{\Delta t}$$

References:

Anton, H., Rorres, c., Elementary linear algebra. Eighth Edition.

John Wiley and sons, 2000. (see pge 328 for an example

On rotations).