A Fundamental Definition of Information and Its Relation to Curves in the Context of Decisions and Symmetry

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Abstract

Perhaps information depends upon patterns rather than binary values. The definition of information given here is that it is that of opposites. This is justified by the use of curves (functions) and basic calculus (continuity). An essential formulae denoting a structure is given. It is very similar to the fundamental equation of dualities in black holes expounded in previous papers. There may not be a more absolute opposite than that of zero and infinity. Taking the inverse of each gives the other so the polarity should be obvious. But what is in the middle? Patterns! There is not anything particularly new in this paper but the main point is to assert that information should be defined as the opposite implicit criteria.

Introduction: Using the heuristic from previous papers we have:

$$curve = rule = curve = rule = curve = rule \ldots.$$

Where the equality sign is an operator much like a choice function. Here I use the ordinary notation of 0 and 1 occasionally but additionally true or false and operators.

The operator is defined such that:

$$D_x = dx \ \ or \ \ D$$

Where :

$$dx = x \ \ often.$$

A fundamental definition of information is given as:

$$True = \ \infty \ or \ \infty^{-1}$$

$$False = \ \infty \ \ or \ \ \infty^{-1}$$

$$True = 0 \ or \ 0^{-1}$$

$$False = 0 \ or \ \ 0^{-1}$$

Results: Now that the definition is made we can pursue the necessary operator(s). For symmetric shapes (symmetry is a profound concept) we can write the number of bits employed as the lengths are apparent. Rescaling we can write the fraction: k/n.

$$dx = \ \ n \ bits$$

Thus:

$$0 = n \; or \; 0 = \frac{1}{n}$$

$$1 = \; n \; or \; 1 \; = \frac{1}{n}$$

Thus:

$$false = \frac{1}{n} \; or \; n$$

$$True = n \; 0r \; \frac{1}{n}$$

Thus applying true to false gives :

$$\frac{k}{n} \; o \frac{n}{k'}$$

Is equal to the decision term:

$$\mu$$

Here the fundamental equation of duality (perhaps calculable in some respects) is

$$\frac{\text{Ɣ}(x)}{k} \pm \frac{k'}{\text{Ɣ}'^{(x)}} = \; f$$

Or in a more palatable format:

$$\frac{n}{k} \pm \frac{k'}{n} = f \;\; where \;\; n \;\; represents \;\; dx \; etc$$

Thus as:

$$n \to \; \infty \quad ; \qquad \infty + 0 = f$$

$$n \to \;\; 0; \qquad \infty + 0 \; = f$$

So to examine:

$$\frac{dx}{k} \pm \frac{k'}{dx} = f$$

Now we introduce the operator:

$$D_x$$

Which is either the differential operator or simply dx.

Now:

$$D_x \left(\frac{dx}{k} \pm \frac{k'}{dx} \right)$$

Produces:

$$D_x\left(\frac{x}{k} \pm \frac{k'}{x}\right) = \frac{1}{k} - \frac{k'}{x^2}$$

$or\ \ using\ \ D_x = dx\ \ we\ have\ \ dx\ \left(\frac{x}{k} \pm \frac{k\prime}{x}\right) = \frac{x^2}{k} + \ \ k'$

Type equation here.

So for forces:

$$F = \frac{kmM}{x^2}$$

And:

$$F = kx$$

(it is difficult to produce the kx term!)

For equations 1 and 2 :

$$1 \rightarrow \frac{dx^2}{k} + k' = 0\ or\ \ \infty$$

$$2 \rightarrow \frac{1}{k} - \ \ k'x^2 = \ \ 0\ or\ \infty$$

Or a range between.

Setting k = k' = I and adding we have:

$$dx^2 + 1 + 1 - dx^2 = 2$$

Thus:

$$0 + \ \ \infty = 2\ \ (\ in\ certain\ respects!)$$

Showing (perhaps) that information is not restricted to binary values. We can have more than 2 values when actually applied. So for 0 and 1 = > 0+ 1 =2 .

Using the number of bits :

$$n = dx = \frac{1}{n} = \frac{1}{dx}$$

Information is a matter of geometry. So writing;

$$D_x\left(\ kx \pm \frac{k'}{x}\right) = k - \frac{k'}{x^2}$$

Or for :

$$D_x = \ \ dx$$

$$D_x\left(\ \ kx \pm \frac{k'}{x}\right) = kx^2 + \ \ k'$$

Thus for curves in general:

$dx\ is\ proportional\ to\ n\ or \frac{1}{n} bits$ such the number of bits can be a fraction. This can be restored by changing dx (calculations may follow and k and k' can be suitably chosen. (ie k/n)

So that:

$$D_x f(x) \pm D_x g(x) = \ n\ or\ \frac{1}{n}$$

But by definition:

$$n\left(\frac{1}{n}\right) \rightarrow \ D_x(D_X^{-1}) = \ I$$

So for n depending on dx or dy:

$$D\left(f(x)\right) = \frac{f(x)}{n} = \frac{y}{n}$$

And:

$$D_x\big(f(x)\big) = \frac{f(x)}{n} = \frac{x}{n}\ where\ for\ symmetry\ dx\ is\ equivalent\ to\ dy$$

NB:

$$D_x\left(\frac{1}{x}\right) = \ -x^{-2}$$

$$D_x\ \left(\frac{1}{x^2}\right) = \ -2x^{-3}$$

Such that differing functions can be found in the structure. So:

$$D_x\left(\frac{1}{x^2} \pm x\right) = \ -2x^{-3} \pm 1$$

If:

$$using\ D_x\ again = \ 6x_4$$

Now if:

$$x \rightarrow 0 = \ \ 6\ (\infty)$$

And if:

$$x \rightarrow \ \infty = \ \ 6(0)$$

Thus why Information is a pattern of sequences (or functions) rather than binary may possibly be shown. Thus information depends on the infinitesimal structure rather than arbitrary values. This has implications to consciousness, which is a "seeing" process.

So from past papers:

$$C: \; D_x^n \rightarrow \; n \; or\, these \; inverses.$$

Again using the heuristic:

$$curve = rule = curve = rule \; ....$$

We may have:

$$curve\;(rule) = f(x)$$

$$rule(curve) = f(x)$$

$$curve\;(\;rule^{-1}) = \; f^{-1(x)}$$

$$curve^{-1}(rule) = \; f^{-1}\;(x)$$

$$curve^{-1}\;(rule^{-1}) = \; f(x)$$

$$rule^{-1}(curve^{-1}) = f(x)$$

Or such combinations. So for C (awareness):

$$rule\;(\;curve) = \; x^2(\;D_x^n) = \; 2x\;(operating\, from\, right)$$

$$curve\;(rule) = D_x^n\;(x^2) = 2x\;(operating\, from\, left)$$

But for symmetric processes:

$$D_y(x^2) \rightarrow \; D_x(y^2)\; 0r\; 0 = 0$$

This should hold even for:

$$x = \; \infty \; or \; y = \; \infty$$

Thus:

$$D_y(\infty) = D_{x(\infty)} = 0$$

Thus:

$$D_{y(\infty)} - \; D_{x(\infty)} = 0$$

Showing that (from previous papers):

$$\frac{d}{d\infty}\infty - \frac{d'}{d\infty}\infty = \; \mu \; the \; decision\, term.$$

So:

$$rule(\infty) - \; \infty(rule) = \; \mu$$

$$curve\;(\infty) - \; \infty(curve) = \; \mu$$

And combinations. This should reduce to a geometry. Nb the brackets here indicate application of operators.

References

Susskind, L., Stanford quantum mechanics lectures, on internet.