Prologue - Relativity (or not)

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Dimensions and slot machines

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Think of an n-dimensional system as a slot machine that is expressed as a single valued function. $\varphi\left[n, w_i\left(\tau_i\right)\right]=\left[w_0(\tau_0)\right]+\left[w_1(\tau_1)\right]+........\left[w_n(\tau_n)\right]=\sum_{i=0}^{n} w_i\left(\tau_i\right)$ where each $f_i = w_i\left(\tau_i\right)$ is functionally separate (independent) of the others, and $\varphi(n, w_i, \tau_i)$ is a widget counter. In this context, the number n is called the **dimension** of the system, which corresponds to the widget count.

(N0te: real slot machines only include positive integers; these slot machines include positive real numbers in each slot.)

Even though the widget value w_i may be changing for each individual widget, the total number of widgets remains the same, even though the function value of $\varphi\left[n, w_i\left(\tau_i\right)\right]$ changes with each widget as a function of τ . It is only when all the widgets have stopped, that $\varphi(n, w_i)$ has a distinct function value $\varphi(n,W)$, where W is no longer of any of the τ_i

Note that each widget may itself be a composite function, e.g. $w_i[(x, y,....z, \tau_i)] = \cos(\tau_i(x+y^2)+x^3y^2+\cosh(z^5\tau_i))$ where $\{x, y, ...z\}$ can be interpreted as "spatial" variables, and τ_i as a common time within each widget.

One can envision this as a slot machine, where the slot values are set at stationary values before the coins are inserted and the lever is pulled, which is called an initial state. When the lever Is pulled, the slot machine is in a state of transition, with each slot spinning independently. As each slot comes to rest, the value in that individual slot reaches a final value, but it is only when all the slots have reached their final state that the overall functional value $\varphi(n,W)$ can be assessed.

Note that if an observer should chance upon a slot machine in a state of change, when (and where) no-one else was around, and the lever had been removed, it would be impossible to tell the initial state of the machine, so the observer could not predict the final state even if one knew the mechanical description of the machine in infinitely precise detail.

However, one can imagine that all the slots were running at the same rate of "time", so that $\tau = \{\tau_0 = \tau_1 = \tau_2 = ... = \tau_n\}$ and in that case, one could imagine a common initial state $\tau_0 = \{\tau_1 = \tau_2 = ... = \tau_n\}$ and a common final state $\tau'_0 = \{\tau'_1 = \tau'_2 = ... = \tau'_n\}$, so that all the slots start and end at the same "time". Furthermore, one could even imagine setting $\tau_0 = 0$ if one could imagine a lever being pulled by somebody, (somewhere, some when), where the lever wouldn't even have to be in the casino. And finally, if the observer left before all the slots stopped turning, he would never know the final state of the slot machine.

The condition of "independence" can also be interpreted as "non-interaction", where the values of widget in its individual slot does not interact with any of the values of any of the other slots. Then each widget is a model of a single independent "particle" (however complex internally), that is not interacting with any other particle.

Suppose it is required to reset a stopped slot (in its final state) back to zero. This can be done in one of two ways:

1. The slot value can be multiplied by zero, since $0 \cdot W_i = 0$ independently of slot value, or
2. The slot can be set to zero by adding its complex conjugate: $W_i + (i^2) W_i = W_i - W_i = 0$

Suppose it is required to reset a stopped slot to 1 , where $1 \cdot W_i = W_i \cdot 1 = W_i$. One can then divide W_i by itself, so that $\frac{W_i}{W_i} = 1$, noting that $\left(\frac{W_i}{W_i}\right)^n = 1^n$.

In particular

$$1_{W_i} = Log_{W_i} W_i$$

$\left(\frac{W_i}{W_i}\right)^2 = \left(1_{W_i}\right)^2$ for $n = 2$, and

$$1_1 = Log_1(1)$$

As long as it is understood that the final state has been reached at any instant of time, one can replace $W_i(\tau)$ with w_i

A slot machine where all its values are in the final state $w_i = 1$ is said to be "diagonalized to its basis set" in a matrix $[I_n]$ where $Tr[I_n] = n$ and $Det[I_n] = (1)^n$, where the trace $Tr[I_n]$ is the widget count, and the Determinant is its entropy.