Physical Simplicity

By J.A.J. van Leunen

Last modified: 17 september 2017

Abstract

Physical reality must be simple. This reasoning is the general idea behind Occam's razor. However, it is also a general physical principle.

Foundation

The foundation of physical reality has a very simple structure. This structure also has the property that it, similarly to the evolution of a seed, automatically extends into higher levels of the structure of physical reality that are more complicated and offer more functionality.

Sets are very simple structures, but they do not automatically extend to a more complicated higher level structure.

Relational structures are sets that restrict the kind of relations that the structure allows to exist between the elements of the set. An enormous diversity of such relational structures exists. One of them is classical logic. Its elements are logical propositions. This structure does not automatically extend into a more complicated structure.

Extension

In 1936 two scientists discovered a relational structure that is quite like classical logic and therefore they called it quantum logic. It automatically extends into a separable Hilbert space. A Hilbert space is a mathematical repository that can store separate numbers in the eigenspace of an operator. Hilbert spaces can only cope with real numbers, complex numbers, and quaternions. Quaternions can store combinations of a real scalar and a three-dimensional vector. Thus, these numbers are ideally suited for the storage of a timestamp and a three-dimensional spatial location.

Each infinite dimensional separable Hilbert space owns a unique non-separable Hilbert space that embeds its separable partner and its contents. The non-separable partner harbors operators that can store quaternionic continuums. The combination represents a base model that features a subspace which scans over the base model as a function of a real progression value. In this way, the scan sequences the stored timestamps. This base model offers a powerful platform for modeling the dynamical behavior of physical reality. It combines Hilbert space operator technology with quaternionic differential and integral calculus.

Modules

An important observation is that all observable objects in the universe are modules or modular systems. A set of elementary modules exist that configure all other modules. Also, two categories of super-tiny objects exist that in separation stay unobservable, but that in huge ensembles become perceivable. These objects are shock fronts. Warps are one-dimensional shock fronts that carry a standard bit of energy. Clamps are three-dimensional spherical shock fronts that carry a standard bit of mass. Together, these super-tiny objects configure all other discrete objects. Shock fronts only occur as the reaction of a carrier field on a trigger. A periodic one-dimensional trigger can generate strings of warps that behave like photons. A private stochastic process that owns a characteristic

function generates the hop landing locations of elementary modules that hop around in a stochastic hopping path. The hop landing locations constitute a hop landing location swarm that coherently moves as one single unit.

The elementary modules combine into modules, and stochastic processes that own a characteristic function also generate the footprints of these modules. Consequently, the module also moves coherently as a single object. Thus, this characteristic function controls the binding of the components of the module. Finally, modules configure modular systems.

References

[1] "Division algebras and quantum theory" by John Baez. http://arxiv.org/abs/1101.5690

[2] Rediscovered Dark Quanta; http://vixra.org/abs/1709.0150

[3] Hilbert Book Model; https://en.wikiversity.org/wiki/Hilbert_Book_Model_Project