Mathematics

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Type theory

A type, τ, has properties of frame, φ, as (object) τ_φ, and (observable) $\varphi\tau$.

Frame φ,

$$
\begin{aligned}
&\varphi\ \{ \\
&\quad \tau_\varphi \leftarrow \tau \\
&\}\ ,
\end{aligned}
$$

establishes a context of association, such that we learn of the character or meaning or object of recognition represented by a type when we learn about

$$\tau_\varphi \leftarrow \tau$$

in the relation of abstraction.

The association by abstraction between a syntactic identity and a semantic object is a representation of observability. A physical frame is a physical epistemology, a metaphysical frame is a metaphysical epistemology, and a generic frame is either or both physical or metaphysical in its individual identities. [TMI/2019]

An observable type has an additional degree of freedom over a naive type. It may be a member of a frame that is physical or metaphysical, or some derivation of either that defines its character substantially.

With frame *φ,*

$$
\begin{aligned}
&\varphi\ \{\\
&\quad \tau \leftarrow \varphi\tau\\
&\}\ ,
\end{aligned}
$$

an observable, *φτ,* is related by representation of abstraction to an identity classified by the term *type*.

The indefinite abstraction proposes the identification of an object of recognition. The identity has aspects of observation ($\varphi\tau$) and utilization (τ_{φ}) that employ the relevant frame of reference, φ. The identity is a member of the least constructed class of representation relevant to logic.

A frame, φ, proposes terms of recognition. The frame and its terms constitute a type class (is itself a type) employed to propose a foundation to the observation of fields of observation enveloped by the frame. The frame is the identification and characterization of terms of representation.

A metaphysical frame is subject to metaphysical incompleteness [φζ/2019]. A physical frame is subject to logical incompleteness [GÖDEL].

Review

Both are due to complexity, at radically different length scales. The first represents the inability of an individual to replicate itself into an independent and shared intellect in order to observe and comprehend itself. The self is metaphysical, meaning the semantic horizon fades into "fractal cycles" of objective substance. The incompleteness of a system of logic is a property of that logical system (*e.g.* arithmetic), and the incompleteness of metaphysical epistemology is a property of physiological consciousness.

The complexity of *framed type theory* in comparison of differentiation with *abstract type theory* is not distinctive. And by this observation, the framed type replaces the abstract type in mathematics as naive. The conception of the most basic atom of logical construction proposes a degree of freedom that maps types and their properties to their frame, a convenience of removal from the observation or employment of the type that is otherwise representationally equivalent to axiomatic induction.

The conception of mathematical atoms as logical types serves to clarify conception by transparency, and opens mathematics to contextual objectification.

The qualification of abstract atoms as physical is transparent. The history of logical systems structured by framing includes modern physical science. This is because contextual objectification is representationally equivalent to a method of organization for the complexity present in a non-naive field.

The membership of that complexity may include the metaphysical consciousness. When an object of recognition has complexity in potential with respect to the field of observation, as in the case of representational physical spacetime, the logical representation of the field may be able to accommodate that complexity without engaging it immediately. This "distance of removal" must be differentiated from the representational abstraction which is subject to issues of ambiguity. An enormous subtlety in one case is a pedantic adherence to propriety of conception, while in another case the handling of physical terms in a metaphysical frame may encounter a fairly obvious and ordinary error of conception.

Notes

[KAG/1968] Don Knuth, "Semantics of context-free languages", Mathematical systems theory, V2 N2, Springer Verlag, 1968
[GÖDEL] Kurt Gödel, 1931, Logical incompleteness
[φζ/20190519/1] Metaphysical field theory
[TMI/20190616/1] Theory of mechanical information

Series

[MATH/20190618/1] Type theory (#1)

Mathematics: type theory
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