Semantics of Physical States

by Sven Nilsen, 2019

A physical state is a system which serves as a background source of information which we can use to derive measurements and observations, from which we can form hypotheses about the nature of reality.

In path semantics, a normal path is a perfect prediction. Ideally, we would like all of our predictions to be perfect, but this does not always work, since normal paths do not always have a solution. On the other hand, a probabilistic path is always defined for finite function types. The general framework which we define measurements and predictions in physics uses probabilistic truth values.

However, probabilistic truth values are not the physical state. Just like a probabilistic truth value from a probabilistic path says something about a function, the probabilities we use to talk about measurements and predictions in physics are about the physical state.

One must make a distinction between descriptions of physics that describe the state and statements that talks about the state.

It is also possible to think about languages in general used for reasoning. Probability theory is an example of a language where one can make inferences and deductions.

The notion of identity as defined by path semantics requires that whenever we talk about something, and we wonder whether A and B are identical, then the statements we make about A and B must be the same. With other words, the language we use for reasoning requires consistency.

This consistency is provided by the source of information we use. It is often not given by some sort of complicated mathematical theory about language, but simply by using the same source of information and a well-defined method of constructing statements about the source. Once you start with the same information, the correct way of applying mathematics for reasoning follows from the study of this general phenomena.

A physical state is a principle that from measurements and observations, one can derive an underlying structure which contains the same or more information than the measurements, making it possible to make predictions.

Thoughts, feelings and consciousness are parts of the physical state. From a description of a physical state, thoughts carry no special separation from the rest of the source of information.

The challenge is to figure out how the existence of an observer can happen, despite its non-special part of the physical state.

I believe the most likely approach to succeed that can explain the existence of an observer, is by combining some well-defined general property of the physical state with observer selection effects. This should lead to deterministic computer programs where this phenomena can be studied.