

# Reality is indeterministic

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## ◆ Reality is continuous

If reality were not continuous, it could be represented by the integers: 0, 1, 2,.... Suppose that reality could be represented by the integers. What is the length of the diagonal of a square having sides of length 2? 2 times the square root of 2, which is not an integer. This implies that reality is continuous, requiring the real numbers for representation. This conclusion generalizes to spacetime with time as the fourth dimension.

Since reality is continuous, like the real numbers, a point can't be observed because it would take an infinite amount of time to observe a point. An interval can't be observed because its endpoints can't be observed. What can be observed? Probability distributions. More precisely, the continuum features of our observations can be represented only in terms of probability distributions.

## ◆ Knowability principle

Reality — the totality of what exists — is limited to what is logically knowable.

Something that is logically unknowable can't affect our observations in any way. Hence, something that is logically unknowable to us is logically unknowable to God, otherwise God could tell us something about it.

## ◆ Reality is indeterministic

Determinism is a relation between two states of reality whereby one state occurs before the other state occurs, and given that the first state occurs, it is logically necessary that the second state occur. This constitutes deterministic order.

But for deterministic order to have meaning, the states must be deterministic, that is, discrete. The start and end of each state in time must be discretely defined so that the states have a well-defined order. Similarly, the spatial boundaries of a state must be discretely defined so that the states have well-defined spatial relations — unless each state is a state of reality as a whole. The same applies to the other features of a state. In short, for deterministic order to have meaning, the states must be discretely defined so that we can specify what causes what.

Since reality is continuous, knowledge of states is, of logical necessity, probabilistic. By virtue of the knowability principle, states, in turn, are probabilistic, and, hence, indeterministic. Therefore, reality is indeterministic.