

Peer Review

Review of: "Volume-Based Probability: Outcome Frequencies from Deterministic Geometry"

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This is a nicely written paper describing how probabilistic frequency values can arise from strict deterministic dynamics through coarse graining. A great many assumptions are required to support the proof. This result does not seem to be all that surprising given the extensive literature available on symbolic dynamics and chaotic systems theory. I am wondering what exactly distinguishes this result from what is already known in that literature. The author promises to demonstrate how the Born rule of quantum mechanics can arise from this approach. They state that that will be shown in a subsequent paper as it is certainly not clear here. After all, the determinism in quantum mechanics is not in the dynamics of measurement values of quantum systems (assuming that even has any meaning) but in the dynamics of the wave function, which relates to the probability distribution of values of a system. I will be interested to see what they show. I wonder if the author is aware of the work of Masao Nagasawa, who many years ago showed the equivalence between linear Schrödinger equations and non-linear diffusion equations, which have identical probability distributions both given by a Born rule. The derivation of this in the case of the diffusion equation is entirely classical. Likewise, there is an equivalence between linear diffusion equations and non-linear Schrödinger equations, again with identical probabilities. His is a very deep result.

Declarations

Potential competing interests: No potential competing interests to declare.