Abstract Submitted
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Hidden variables in quantum mechanics: Generic models, set-theoretic forcing, and the appearance of probability ROBERT A. VAN WESEP — The hidden-variables (HV) program in quantum mechanics proposes that physical states have properties that are not observable in the ordinary sense and which uniquely determine the outcome of any observation. It is well known that one cannot consistently assign values to all propositions in a Hilbert space of dimension ≥ 3, but for systems of commuting propositions one always can, so there is some interest in HV in this limited setting. But the same objection has been raised against HV as against the many-worlds view (MW), viz., that it cannot accommodate the notion of probability, specifically the Born rule. We have shown that the Born rule is actually derivable in MW[1]. In the present work we do the same in the HV setting[2]. Specifically, we show that the HV premise implies that the sequence of values assigned by a given HV state to a set of commuting propositions is indistinguishable from a sequence randomly generated according to the Born rule. In fact, the same is true for systems of noncommuting propositions satisfying a natural condition[3]. The sequences demanded by HV are *generic* in the set-theoretic sense. The fascinating ontology of generic objects in set theory therefore applies to HV states in physics.
[1] R.A. Van Wesep, Ann. Phys. 321 (10) (2006) 2438–2452.
[2] R.A. Van Wesep, Ann. Phys. 321 (10) (2006) 2453–2475.
[3] R.A. Van Wesep, Ann. Phys. 321 (10) (2006) 2476–2490.

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