Re: Quantum Entanglement Explained by Jacobson Radical + PI

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On 8 Jul 04 20:04:33 −0400 (EDT), Osher Doctorow wrote:
>LEMMA. P(A U B) < = P(A U B)_I < = P(A U B)_Q
>
>if A, B are positively quadrant dependent, that is to say P(AB) > =
>P(A)P(B) in the sense of Lehmann (1967) − at least in the case of
>P(A U B) on the far left hand side of the inequality. (Here Q
>replaces M since we refer to quantum probability.)

Positive quadrant dependence says in terms of probability−statistics that A and B, or for random variables X and Y, that the pair in− creases together rather than being either unrelated or one in− creasing when the other decreases − again, emphasizing their probabilistic and statistical behavior. So positive quadrant dependence is quite appropriate in this inequality. To give the corresponding expressions for X and Y (random variables of continuous type, although discrete ones can be handled by extension), one uses the usual A = {w: X(w) < = x}, B = {w: Y(w) < = y), or perhaps more appropriately labelling A as A_x or Ax, B as B_y or By where Ax means A with a subscript x in these particular contexts.

Notice that the Jacobson radical provides a deep connection between probability−statistics and the rest of algebra once the x o y and 1 + y − x relationship is understood. Since fuzzy multivalued logicians and other mathematical logicians usually claim to trace themselves back to algebra rather than to probability−statistics, the connection via the Jacobson radical resembles more the two−way connection of geometry and topology via the Gauss−Bonnet theorem and its corollaries than a one−way connection in which algebra allegedly gives rise to everything else.

If algebra is really interpretable in two very different ways, one by logic and one by probability−statistics, and similarly for logic, then the "exceptional" position of quantum logic also would seem to be called into question. Quantum logic is currently thought to represent a "world of its own" separate from other logics and with very deep algebraic underpinnings, and researchers into it generally accept mathematical physics' divorce from most of probability−statistics and don't question anomalies and paradoxes like the Heisenberg Uncertainty Principle (HUP) that come from mathematical or theoretical physics. If it is not really exceptional, and relates to probability−statistics fundamentally as much if not more than to algebra and physics, then the results for Quantum Entanglement may be expected to characterize much of the foundations of Quantum theory.

Osher Doctorow