

The Fallacy Underlying Bell Theorems

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Abstract

John Bell's 1964 article On The Einstein Podolosky Rosen Paradox [1] concludes that a discrepancy between quantum theoretical and Kolmogorov-type expectation values is due to non-locality.

On the other hand, this document concludes that the discrepancy is due to information loss rather than non-locality.

1 Explanation

In his 1964 article On The Einstein Podolosky Rosen Paradox [1], John Bell concludes that a discrepancy between his equation (2) and (3) expectation values is due to non-locality. This discrepancy can also be identified by direct mathematical evaluation of equation (2) [2].

Bell's equation (3) involves property values whereas his equation (2) involves the polarity of property values.

However, the conclusion that the discrepancy is due to non-locality is a fallacy as it can be explained readily by the mathematical loss of information. Information is lost when the actual property values of equation (3) (real numbers) are converted to the binary polarization values implicit in equation (3).

Bell's reason for invoking non-locality appears to stem from his misconception that the result of his equation (2) should equal the result of his equation (3) but, as explained above, in general this is not the case.

2 Conclusion

As the discrepancy between the results of Bell's equations (2) and (3) can be explained by information loss rather than by non-locality, Bell's conclusion that, "In a theory in which parameters are added to quantum mechanics to determine the results of individual measurements, without changing the statistical predictions, there must be a mechanism whereby the setting of one measuring device can influence the reading of another instrument, however remote" is refuted.

Consequently, all subsequent Bell theories are refuted.

References

- [1] J. S. Bell. On the einstein-podolsky-rosen paradox. *Physics*, 1:195–200, 1964.
- [2] R. L. Mc Murtrie. J. s. bell's inequality postulate reviewed by direct comparison formulae. *Current Research In Statistics And Mathematics*, 5(1):1 – 8, April 2026.

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