

Separate- versus common-common-cause-type derivations of the Bell inequalities

Hofer-Szabó, Gábor (2007) Separate- versus common-common-cause-type derivations of the Bell inequalities.

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Abstract

Standard derivations of the Bell inequalities assume a common common cause system that is a common screener-off for all correlations and some additional assumptions concerning locality and no-conspiracy. In a recent paper (Grasshoff et al., 2005) Bell inequalities have been derived via separate common causes assuming perfect correlations between the events. In the paper it will be shown that the assumptions of this separate-common-cause-type derivation of the Bell inequalities in the case of perfect correlations can be reduced to the assumptions of common-common-cause-system-type derivation. However, in the case of non-perfect correlations a non-reducible separate-common-cause-type derivation of some Bell-like inequalities can be given. The violation of these Bell-like inequalities proves Szabó's (2000) conjecture concerning the non-existence of a local, non-conspiratorial, separate-common-cause-model for a delta δ -neighborhood of perfect EPR correlations.

Keywords: Bell inequality, common cause

Subjects: [Specific Sciences: Physics: Quantum Mechanics](#)

ID Code: 3493

Deposited By: [Hofer-Szabo, Gabor](#)

Deposited On: 09 September 2007