QRAFT-RA: Deterministic Contextual Variational Framework for Controlled Non-Classical Correlations

Abstract

The invention relates to a deterministic contextual variational framework for generating and evaluating non-classical correlations under controlled contextual dependence on measurement settings. A conditional contextual distribution over a latent variable is defined as a normalized function of a contextual action and a concentration parameter. Correlation functions and Bell-type functionals are computed deterministically by numerical quadrature on a discretized latent domain, without Monte Carlo sampling, thereby improving reproducibility and auditability. The framework further provides operational no-signaling diagnostics computed by comparing marginal statistics across remote setting choices and, optionally, scanning these diagnostics over discrete setting grids to produce verification results. The concentration parameter enables tuning of correlation strength while maintaining deterministic behavior. The invention is applicable to simulation, verification, optimization, and control of complex systems where contextual correlations, stability, and reproducibility are required.