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Four and Five-body non-local correlations in pure and mixed states[1] SANTOSH SHELLY SHARMA, Departamento de Fisica, Universidade Estadual de Londrina, Londrina, Pr Brazil, NARESH KUMAR SHARMA, Departamento de Matematica, Universidade Estadual de Londrina, Londrina, Pr Brazil —
In our earlier works [1], quantifiers of four and three-body correlations based on four qubit invariants had been constructed for pure states. The principal construction tools, local unitary invariance and notion of negativity fonts, make it possible to outline the process of selective construction of meaningful invariants that quanify N and $N-1$ qubit correlations. It is found that, in general, starting from degree k invariants relevant to detection and quantifcation of specific type of non-local quantum correlations in $(N-1)$ $(N>2)$ qubit system, one can construct degree k coefficients of an N-qubit bilinear form. When $k=2^{N-2}$ $(N>2)$, one of the invariants of degree 2^{N-1} quantifies N-body non-local correlations The process is recursive. While for few body systems it yields analytical expressions in terms of functions of state coefficients, for larger systems it can be the guiding principle to numerical caculations of invariants. To illustrate the process, an expression for a five qubit correlation quantifier for pure states is constructed. In addition, the extension to specific rank two mixed states through convex-roof extension is investigated. [1] S. Shelly Sharma and N. K. Sharma, Phys. Rev. A 87, 022335 (2013); Phys. Rev. A 82, 052340 (2010).

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