Title:	Revisiting comparison between entanglement measures for two-qubit pure states
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Abstract:	Given a non-maximally entangled state, an operationally significant question is to quantitatively assess as to what extent the state is away from the maximally entangled state, which is of importance in evaluating the efficacy of the state for its various uses as a resource. It is this question which is examined in this paper for two-qubit pure entangled states in terms of different entanglement measures such as negativity (N), logarithmic negativity (LN), and entanglement of formation (EOF). Although these entanglement measures are defined differently, to what extent they differ in quantitatively addressing the earlier mentioned question has remained uninvestigated. The theoretical estimate in this paper shows that an appropriately defined parameter characterizing the fractional deviation of any given entangled state from the maximally entangled state in terms of N is quite different from that computed in terms of EOF, with their values differing up to ∼15% for states further away from the maximally entangled state. Similarly, the values of such fractional deviation parameters estimated using the entanglement measures LN and EOF also strikingly differ among themselves, with the maximum value of this difference being around 23%. This analysis is complemented by illustration of these differences in terms of empirical results obtained from a suitably planned experimental study. Thus, such an appreciable amount of quantitative non-equivalence between the entanglement measures in addressing the experimentally relevant question considered in the present paper highlights the requirement of an appropriate quantifier for such intent. We indicate directions of study that can be explored towards finding such a quantifier.
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