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Ambiguities in recurrence-based complex network representations of time series

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Recently, different approaches have been proposed for studying basic properties of time series from a complex network perspective. In this work, the corresponding potentials and limitations of networks based on recurrences in phase space are investigated in some detail. We discuss the main requirements that permit a feasible system-theoretic interpretation of network topology in terms of dynamically invariant phase-space properties. Possible artifacts induced by disregarding these requirements are pointed out and systematically studied. Finally, a rigorous interpretation of the clustering coefficient and the betweenness centrality in terms of invariant objects is proposed.

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