

Detecting geometric measure of entanglement of graph states on quantum computer

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Graph states generated by operator of evolution with Ising Hamiltonian are studied. The geometric measure of entanglement of the states is quantified analytically. For this purpose relation of the geometric measure of entanglement with the mean value of the spin is used (the relation was obtained in [1]). Also, quantum protocol for preparing graph states of spin system with Ising interaction is constructed. The geometric measure of entanglement of the states is detecting on the IBM's quantum computers.

We obtained that entanglement of spin with other spins in the graph state depends on the graph properties, namely it depends on the degree of vertex that corresponds to the spin.

[1] A. M. Frydryszak, M. I. Samar, V. M. Tkachuk, Eur. Phys. J. D 71, 233 (2017).

Primary authors: GNATENKO, Khrystyna (Ivan Franko National University of Lviv, Department for Theoretical Physics); Prof. TKACHUK, Volodymyr (Ivan Franko National University of Lviv, Department for Theoretical Physics)

Presenter: GNATENKO, Khrystyna (Ivan Franko National University of Lviv, Department for Theoretical Physics)

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