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ARE ALMOST ALL n-VERTEX GRAPHS OF GIVEN DIAMETER HAMILTONIAN?

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Abstract: Typical Hamiltonian properties of the class of n-vertex graphs of a fixed diameter k are studied. A new class of typical n-vertex graphs of a given diameter is constructed.

The question of S.V. Avgustinovich on the Hamiltonian property of almost all such n-vertex graphs has been solved. It is proved that almost all n-vertex graphs of fixed diameter $k = 1, 2, 3$ are Hamiltonian, while almost all n-vertex graph of fixed diameter $k \geq 4$ are nonHamiltonian graphs. All found typical Hamiltonian properties of n-vertex graphs of a fixed diameter $k \geq 1$ are also typical for connected graphs of diameter at least k, as well as for graphs (not necessarily connected) containing the shortest path of length at least k.

Keywords: graph, Hamiltonian graph, Hamiltonian cycle, diameter, typical graphs, almost all graphs.

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