Perfect state transfer in Grover walks between states associated to vertices of a graph.

Summary: We study perfect state transfer in Grover walks, which are typical discrete-time quantum walk models. In particular, we focus on states associated to vertices of a graph. We call such states vertex type states. Perfect state transfer between vertex type states can be studied via Chebyshev polynomials. We derive a necessary condition on eigenvalues of a graph for perfect state transfer between vertex type states to occur. In addition, we perfectly determine the complete multipartite graphs whose partite sets are the same size on which perfect state transfer occurs between vertex type states, together with the time.

MSC:

81P45 Quantum information, communication, networks (quantum-theoretic aspects)
05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)
81Q99 General mathematical topics and methods in quantum theory

Keywords:

perfect state transfer; Chebyshev polynomial; Grover walk

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