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Chaobin Liu* (cliu@bowiestate.edu). *Quantum walks in terms of density operators*. Preliminary report.

A new approach to quantum walks is introduced. Considering a quantum system undergoing some unitary discrete-time evolution in a directed graph G , we think of the vertices of G as sites that are occupied by the quantum system, whose internal state is described by density operators. We formulate the unitary transformation that governs the evolution of the system (Quantum walks), i.e., it maps density operators to density operators of the system on graphs. We then present examples of this type of quantum walks in which diverse probability distributions are shown. (Received September 21, 2015)