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Perfect quantum state transfer on weighted paths

A quantum spin chain is a proposed method for transferring a quantum state over small distances within a quantum computer. Such a quantum system can be modelled using graph theory and of particular interest to us is the case where the system is a weighted path with potentials or loops. Our main focus is on perfect state transfer (PST) in which the state is transferred perfectly, up to a global phase, after some time t. We explore PST on these weighted paths through the use of orthogonal polynomials associated to the corresponding tridiagonal matrix.