CHRISTOPHER VAN BOMMEL, University of Toronto Mississauga
Quantum Walks, State Transfer, and Modified Paths

Quantum computing is believed to provide many advantages over traditional computing, particularly considering the speed at which computations can be performed. One of the challenges that needs to be resolved in order to construct a quantum computer is the transmission of information from one part of the computer to another. Quantum walks, the quantum analogues of classical random walks, provide one potential method for resolving this challenge. If a quantum walker starts at a vertex of a graph and after some length of time, has probability 1 of being found at a different vertex, we say there is perfect state transfer between the two vertices. If instead, there is a time for which the probability can be made arbitrarily close to 1, we say there is pretty good state transfer between the vertices. We consider the quantum walk model determined by the XY-Hamiltonian, which can be considered as based on the adjacency matrix of the graph, and discuss state transfer results on paths for single and multiple qubit states, as well as paths with small modifications.