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Quantum walks outside of boolean domain as a gate for one, two, or three qubits. THOMAS CAVIN, DMITRY SOLENOV, Department of Physics, Saint Louis University, St. Louis, MO 63103 — Quantum computing needs entangling quantum gates to perform computation and error correction. We will discuss a novel way to implement quantum gates, such as CNOT, using quantum walks that are directed through a network of states outside of the boolean domain. In such implementations it is important to investigate walks on networks of different connectivities. Specifically, we will discuss solutions to non-symmetric linear chain networks and demonstrate how solutions to more complex networks that have branching, such as cubes, can be expressed in terms of linear chain solutions. We then show examples of implementing single qubit and two-qubit entangling gates.

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