
MANIMUGDHA SAIKIA, University of Western Ontario

Multi-qutrit exact synthesis over Clifford+T

Unitary matrices in quantum computing play a similar role to Boolean functions in classical computing, meaning that quantum gates are represented by unitary matrices. For practical classical computers, we choose a set of special gates (known as a universal gate set) and make circuits using these gates to generate any other Boolean function. However, the quantum version of circuit synthesis is a bit more complicated. In this talk, we will introduce what a universal gate set means in quantum computing.

There are various universal gate sets for both single and multi-qubit (two-level quantum system) cases. Due to various advantages, researchers have a growing interest in finding universal gate sets for higher-level quantum systems. To this end, in our joint work with Kalra, Valluri, Winnick, and Yard, we present an algorithm to exactly synthesize a circuit corresponding to qutrit (3-level quantum system) unitaries using the multi-qutrit Clifford+T universal gate set.