

Homothety of entanglement in Grover's quantum algorithm

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Abstract

Entanglement represents an important factor in the speed-up of quantum computational processes [1-4]. It has been of recent interest to analyze the function of multipartite entanglement in quantum algorithms. On the other hand, it has been proved that multipartite entangled states are used in the first phase of the Grover's quantum search algorithm [5]. In this work, we describe the behavior of entanglement in this algorithm, computing it through GME (Geometric Measure of Entanglement). Then, we demonstrate that the behavior of any type of entanglement is independent of the quantity q of qubits for large q , thus exhibiting a homothetic transformation. Finally, we compare this outcome with the one obtained by a fixed-point quantum algorithm and we propose some guidelines for efficient simulation in the context of such an algorithm.

References

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