Bipartite entanglement and hypergraph states.

Summary: We investigate some properties of multipartite entanglement of hypergraph states in purely hypergraph theoretical terms. We first introduce an approach for computing the concurrence between two specific qubits of a hypergraph state by using the so-called Hamming weights of several special subhypergraphs of the corresponding hypergraph. Then, we quantify and characterize bipartite entanglement between each qubit pair of several special hypergraph states in terms of the concurrence obtained by using the above approach. Our main result includes that a graph \( g \) has a component with the vertex set \( \{ i, j \} \) if and only if the qubit pair labeled by \( \{ i, j \} \) of the graph state \( |g\rangle \) is entangled.

Keywords: hypergraph states; bipartite entanglement; concurrence
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