

ALGEBRAIC GEOMETRY OF TREE TENSOR NETWORK STATES

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Tree tensor networks have been used to model the ground states of Hamiltonians in condensed matter physics and quantum chemistry. Exactly which quantum states can be represented by a tree tensor network with a given topology and given restrictions on the parameter tensors? When the restrictions are algebraic, the set of states is a projective algebraic variety. We describe those varieties, using techniques originally developed for phylogenetics.

Joint work with Jason Morton (Pennsylvania State University, USA).