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A Numerical Study of Entanglement Entropy of the Heisenberg Model on a Bethe Cluster BARRY FRIEDMAN, Physics, Sam Houston State University, GREG LEVINE, Physics and Astronomy, Hofstra University — Numerical evidence is presented for a nearest neighbor Heisenberg spin model on a Bethe cluster, that by bisecting the cluster, the generalized Renyi entropy scales as the number of sites in the cluster. This disagrees with spin wave calculations and a naive application of the area law but agrees with previous results for non interacting fermions on the Bethe cluster. It seems this scaling is not an artifact of non interacting particles. As a consequence, the area law in greater then one dimension is more subtle then generally thought and applications of the density matrix renormalization group to Bethe clusters face difficulties at least as a matter of principle.

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