1147-94-89 **Michael M Dotzel*** (md5xc@mail.missouri.edu), 14313 Millchester Circle, Chesterfield, MO 63017. *Probabilistic Energy Minimization on Regular Networks and Applications.* Preliminary report.

Given a regular graph G, we assign to each edge $\bar{ij}$ the probability $p_{ij} = p_{ji}$. Given the adjacency matrix $A(G)$, what choice of numerical values for parameters $\{p_{ij}\}$ minimize $Tr(f[P(G)])$, where f is any strictly convex function and $P(G)$ is the transition matrix of G? We present a clean, geometric solution and characterization of those G with uniform minimizing probabilities. This symmetry-based method also lends itself to application to various problems and considerations. We discuss its explicit application to classifying maximally entangled quantum systems via maximizing the Von Neumann Entropy. In addition, we discuss its use as a novel method of bond order computation in molecular structures under the Huckel theory regime. We also explore its application to a variant of the Calderon inverse problem. (Received December 07, 2018)