Critical Temperature and Field of a Long-Range Maximally Even Antiferromagnetic Ising Model in the Mean Field Approximation
RICHARD KRANTZ, Metropolitan State University of Denver — A long-ranged, one-dimensional, antiferromagnetic Ising model on a two-sublattice Maximally Even (ME) lattice has been developed in the Mean Field Approximation (MFA). A distribution of sites on a one-dimensional lattice, a so-called Maximally Even (ME) Distribution, can be used to describe unusual magnetic orderings of antiferromagnetic Ising systems. In the limit of zero applied magnetic field the temperature at which the net magnetization of the lattice goes to zero, the so-called critical temperature, can be evaluated. When the magnetization of the "down" lattice approaches zero the lattice makes a transition to the paramagnetic state. The magnetic field at which this occurs is the critical field. Both the critical field and the critical temperature depend on: 1) the structure of the lattice – the distribution of up and down lattice sites, 2) the number of neighboring interactions accounted for, and 3) the strength of the interaction between neighboring spins.

Richard Krantz
Metropolitan State University of Denver

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