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Yang-Lee Edge Singularity of the Infinite-Range Ising Model

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Abstract : The Ising model, consisting magnetic spins, is the simplest system showing phase transitions and critical phenomena at finite temperatures. The Ising model has played a central role in our understanding of phase transitions and critical phenomena. Also, the Ising model explains the gas-liquid phase transitions accurately. However, the Ising model in a nonzero magnetic field has been one of the most intriguing and outstanding unsolved problems. We study analytically the partition function zeros in the complex magnetic-field plane and the Yang-Lee edge singularity of the infinite-range Ising model in an external magnetic field. In addition, we compare the Yang-Lee edge singularity of the infinite-range Ising model with that of the square-lattice Ising model in an external magnetic field.

Keywords : Ising ferromagnet, magnetic field, partition function zeros, Yang-Lee edge singularity
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