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Zeros of the 3-state Potts model partition function for the square lattice revisited

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Abstract

We compute the exact partition function for the 3-state Potts model on square lattices of several sizes larger than previously accessible. Making comparison with the exactly solved Ising model we show that, for aspects of the analytic structure close to the ferromagnetic transition point, these lattices are large enough to approach the thermodynamic limit. Subject to certain assumptions this allows for computation of estimates for the specific heat critical exponent. We thus obtain an estimate for this exponent. The estimate is consistent with the known result, thus demonstrating the potential use of this method for other models. We also discuss the antiferromagnetic transition.

Keywords

Author Keywords: classical phase transitions; critical exponents and amplitudes; exact results

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