

P-65 Modulated Phase of a Potts Model with Competing Interactions on a Cayley tree

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We study the phase diagram for Potts model on a Cayley tree with competing nearest-neighbor, prolonged next-nearest-neighbor and one-level next-nearest-neighbor interactions. The main result is that the introduction of one-level interactions has a strong effect on the phase diagram: Firstly it appears to shift the multicritical Lifshitz point to finite temperature, while it was stuck at zero temperature T for all systems with competing interactions, Ising or Potts, studied on the Cayley tree previously; Secondary, as soon as the one-level interactions is nonzero, the paramagnetic phase found at high temperatures for zero one-level interaction disappears, while Ising model does not obtain such property.

P-66 Griffith-Kelly-Sherman Correlation Inequalities for Generalized Potts Model

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Correlation inequalities play an important role in many areas of statistical mechanics. In addition to describing microscopic structure they also provide information about macroscopic properties: for ferromagnetic spin systems they give monotonicity of the critical temperature, inequalities for critical exponents. In the recent work of N. Macris it was shown that a correlation inequality of statistical mechanics can be applied to linear low-density parity-check codes. In this paper we prove Griffith-Kelly-Sherman (GKS) inequalities for the generalized Potts model. At present there are a lot papers and books where the authors proved correlation inequalities for different models. Formulated in this paper Griffith-Kelly-Sherman inequalities for Potts model are new and proof of these inequalities one can consider as new alternate combinatoric proof.

P-67 A New Method for the Analysis of Combined Operation of Electro-Osmotic Dewatering and Mechanical Expression

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Electro-osmosis is especially effective in removing liquid from sludge of colloidal particles for which conventional mechanical dewatering is not very successful. This work presents results of experimental work carried out to study and analyze the combined operation of electro-osmotic dewatering (EOD) and mechanical expression (ME) by use of the Terzaghi-Voigt combined model for considering creep deformation of the material. The EOD-ME process combines the advantage of electro-osmosis and mechanical dewatering and consequently results in reduced void ratio compared to individual operation. The basic differential equation based on the model is solved analytically by assuming that both an electro-osmotic pressure gradient E_{pg} and the modified consolidation coefficient C_e of the material are constant, resulting in the equation of solid compressive pressure in the material as a function of time and position. The results of dewatering experiments show that the electro-osmotic dewatering can be recognized as a kind of consolidation, since it accompanies an increase in solid compressive pressure in the material. The analytical equation also leads to the equation of the average consolidation ratio U_c , which is a measure of the progress of dewatering; this equation can describe well the empirical results under various conditions. The large water content of bentonite slurry can be reduced by electro-osmotic dewatering-mechanical expression (EOD-ME). The void ratio reduction and hence rate of dewatering is higher when electro-osmotic dewatering (EOD) is combined with mechanical expression (ME) than just a traditional

