

Pongthachat Neamsong 2007: Comparison of $q = 2, 3, 4$ and 5 States of The Potts Model for Two Dimensional Square and Triangular Lattices. Master of Science (Physics), Major Field: Physics, Department of Physics.
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Potts Model is the model for studying the behavior of a magnet which nearest neighbor interaction has q spin direction discontinuously in each site. It is called q state Potts Model. The properties of internal energy per spin, specific heat per spin, magnetization per spin and magnetic susceptibility per spin with $q = 2, 3, 4$ and 5 for square and triangular lattices with sites $10 \times 10, 15 \times 15, 20 \times 20$ and 25×25 varying with temperatures are studied.

In the regions where the temperature is less than critical temperature, when the temperature increases, usually the internal energy, specific heat and magnetic susceptibility also increase but the magnetization decreases. When the temperature tends to the critical temperature, the slope of the internal energy is going to the maximum value and gives the maximum specific heat. The magnetization decreases rapidly and gives the maximum magnetic susceptibility. When the temperature is higher than the critical temperature, the internal energy increases and the magnetization is at minimum.

If the number of spin state increases, the value of the critical temperature will decrease. When the calculation is done at higher number of lattice sites the critical temperature decreases appreciably. Square lattice which has spin interaction less than triangular lattice, gives lower critical temperature comparing to the triangular lattice at the same state.

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