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Heat capacity and new classification of phase transitions of fractional order: Ising model[1] VLADIMIR UDODOV, Katanov Khakas State University, KATANOV KHAKAS STATE UNIVERSITY TEAM — Though the one-dimensional Ising model has been the subject of a wide variety of analysis, it remains one of significant interest. Here we show that within the framework of Gibbs distribution this model can undergo fractional and arbitrarily high order phase transitions (PT) as the temperature changes at zero magnetic field. We suggest a new formula to define the order of PT for a special case of $T_c = 0$; it is expressed via the critical exponent α associated with the heat capacity C. The unusual values of α (for example, $\alpha < -10$) are predicted. An interesting transition from 2D to 1D Ising model is considered. It corresponds the situations when the inter-particle interaction is gradually switched off along one of two dimensions. As the system approaches the 1D limit, the critical temperature T_c tends to zero during which the critical exponent α changes continuously . The general formula for an order of PT offered extending formula R. Baxter and it is correct as for $T_C > 0$ and $T_C = 0$. The developed approach is equally applicable to quantum phase transitions.

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