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Phase transitions of high and fractional order VLADIMIR UDODOV, Katanov Khakas State University — On the basis of exact solution it was concluded for the first time that the traditional one-dimensional Ising model (1D IM) has phase transitions (PT) of arbitrarily high order, including fourth-, fifth- and sixth-order phase transitions, according to the Baxter's classification. Moreover, this model also exhibits PT's of fractional order. It was rigorously proved that in the Baxter's approach the order of a PT in 1D IM can be any real number that is not less than the unit. We show further how such an order can be defined consistently. Finally, using the thermodynamic arguments we demonstrate that superconductors can undergo third and higher (including fractional) order PT's within the meaning of Erenfest as the temperature tends to zero. It is established relation wish critical exponent of specific heat and critical magnetic field for superconductor as the temperature tends to zero.

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