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Ferrimagnetic mixed Ising spin (7/2, 1/2) system: by Mean Field Theory, Exact Recursion Relations and Monte Carlo method

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Based on Mean Field Theory, Exact Recursion Relations, and Monte Carlo Simulations, we have studied phase diagrams and magnetic properties of the mixed system of Ising spin-7/2 and spin-1/2 coupled ferrimagnetically. The system consists of two interpenetrating face-centered cubic sublattices of each spin type. A comparative analysis of the obtained results by these methods has been developed. Our calculations have shown a qualitatively good agreement between these three methods' results. However, quantitatively, the produced output quantities values by them show a non-negligible difference. The reasons for that quantitative disagreement have been pointed out in the approximations applied in these different methods. These methods remain nevertheless powerful tools for studying such kinds of systems.

Keywords: Mean Field Theory, Exact Recursion Relations, Monte Carlo Simulations, magnetic properties, Ising spins, power tools.

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