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The SAPBC method on local, non-cluster updates algorithms of Monte Carlo simulation: A study on more convergence of spin correlation at critical temperature

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Here, we work out the computational technique of Screw-Antisymmetric Periodic Boundary condition (SAPBC Method) on local, non-cluster update algorithms of Isotropic nn square lattice Ising model of Monte Carlo Simulations as well. The SAPBC Method, actually, is an extended mixed method of Screw (helical) and Anti-symmetric periodic boundary conditions beyond connection from of nearest neighbor spin of the main lattice to even far away block of the outer (foreign) neighbor spin arrays. In the project, Meanwhile of description of geometry exact details of method and way of spin interaction, have applied to critical slowing down in order to achieve more convergence of spin correlation at critical temperature. Actually, in general, at critical temperature algorithms performed by using SAPBC Method have faster correlation and much shorter autocorrelation time than algorithms performed by using PBC Method. We will also see that Autocorrelation function for the typewriter Metropolis algorithm was found to be zero at high temperatures. For low temperatures it fell to zero and stayed there. The SAPBC Method also confirms and consists with the law of the spatial correlation length with its dynamical critical exponent. Therefore, it can be used as a trenchant method applied to boundary conditions of Monte Carlo simulation problems extending on a variety of other models such as XY-Potts-Heisenberg model and also cluster algorithms such as Wolf, Swendsen-Wangas, Hoshen-Koppelman as well.

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