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**Dependency of Critical Behaviors on Different Order Parameters for
Anti-Ferro Heisenberg Spin Model on Random Networks**

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Magnetization is measured in experiments for both ferromagnetic and anti-ferromagnetic materials to investigate the magnetic properties of materials, and the susceptibility of total magnetization as a function of external field is used to determine Neel or Curi temperatures.

In the Monte Carlo simulation, it is important to define the proper order parameters to describe the spin model, where the magnetization is used as an order parameter for ferromagnetic spin model and the staggered magnetization is used as an order parameter for the anti-ferromagnetic spin model without geometrical frustration. However, it is difficult to define an order parameter for frustrated spin models.

We perform the Monte Carlo simulation for the anti-ferro Heisenberg spin model using the damage spreading as an order parameter, and also perform simulation using both the magnetization and the staggered magnetization as order parameters. Then, we measure the critical temperatures and the critical exponents on Random networks estimated by different order parameters, and then study the dependency of critical behaviors on different order parameters for the anti-ferro Heisenberg spin models.

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