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Finite size scaling theory for discontinuous percolation transitions B. KAHNG, Y.S. CHO, Seoul National University, S.W. KIM, J.D. NOH, University of Seoul, D. KIM, KIAS — Finite-size scaling (FSS) theory has been useful for characterizing phase transitions. When the phase transition is continuous, the critical behavior of a system in the thermodynamic limit can be extracted from the size-dependent behaviors of thermodynamic quantities. However, FSS approach for discontinuous transitions arising in disordered systems has not been studied yet. Here, we develop a FSS theory for the discontinuous PT in the modified Erdös-Rényi model under the Achlioptas process. A scaling function is derived based on the observed fact that the derivative of the curve of the order parameter at the critical point t_c diverges with system size in a power-law manner, which is different from that for continuous percolation transitions. Numerical simulation data for different system sizes are well collapsed onto a scaling function.

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