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Discontinuous percolation transition at a finite threshold BYUNG-NAM KAHNG, YOUNG SUL CHO, Seoul National University — Recent interest of discontinuous percolation transitions (DPT) has been sparked by the explosive percolation model. Even though this model shows an abrupt percolation transition in finite-sized systems, it reveals that the jump of the order parameter shrinks to zero as the system size is increased. To disclose the mechanism of the DPT, a spanning-cluster-avoiding (SCA) model in the Euclidean space was introduced and analytically understood. However, the DPT in the SCA model is trivial because the percolation threshold is one. Thus, it is timely demanding to construct a general framework, under which a non-trivial DPT can take place at a finite threshold. Here, we propose the necessary conditions for the non-trivial DPT, and classify existing percolation models according to this criterion. Moreover, a model, satisfying those conditions and showing a non-trivial DPT, is introduced and discussed in the perspective of the network of networks. We anticipate this theoretical framework to be a platform for further researches on DPT in other disciplinary systems.

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