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Numerical studies of two-dimensional k-core percolation ANDREA LIU, University of Pennsylvania, LINCOLN CHAYES, UCLA , JEN SCHWARZ, Syracuse University — The disconnected-connected phase transition in *uncorrelated* percolation has long been known to exhibit a continuous phase transition. Is this property retained when *correlations* between occupied sites are incorporated into percolation? An example of such a model is k-core percolation. In k-core percolation a constraint is introduced where a site can remain occupied only if it has at least k occupied neighbors; otherwise it is removed from the lattice. The mean field k-core transition is random first-order (or hybrid). What then is the nature of the k-core transition in finite-dimensions? We show numerical evidence for a hybrid transition in two-dimensions for a variant of k-core where there is an additional constraint of pseudo-force-balance. Using finite-size scaling analysis we demonstrate that there is a jump in the usual order parameter at the transition along with, not one, but two, diverging correlation length exponents, neither of which scale as 1/2 (or 1). This model may have some implications for the jamming transition.

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