CLUSTER SIZES IN SUBCRITICAL SOFT BOOLEAN MODELS

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ABSTRACT. We consider the soft Boolean model, a model that interpolates between the Boolean model and long-range percolation, where vertices are given via a stationary Poisson point process. Each vertex carries an independent Pareto-distributed radius and each pair of vertices is assigned another independent Pareto weight with a potentially different tail exponent. Two vertices are now connected if they are within distance of the larger radius multiplied by the edge weight. We determine the tail behaviour of the Euclidean diameter and the number of points of a typical maximally connected component in a subcritical percolation phase. For this, we present a sharp criterion in terms of the tail exponents of the edge-weight and radius distributions that distinguish a regime where the tail behaviour is controlled only by the edge exponent from a regime in which both exponents are relevant.

[Joint work with Lukas Lüchtrath and Marcel Ortgiese.]

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