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A New Method for Establishing Sharp Threshold Functions in Random Intersection Graphs

In a random intersection graph $G(n, m, p)$ to each vertex $v$ from a vertex set $V$ we assign a set of its features $D_v$ by choosing independently each feature with probability $p$ from a feature set $W$. Then we connect vertices $v, v' \in V$ by an edge if and only if sets $D_v$ and $D_{v'}$ intersect. In the talk a new method for establishing threshold functions in $G(n, m, p)$ will be presented. It will be used to determine sharp threshold functions in $G(n, m, p)$ for $k$–connectivity, perfect matching containment and Hamilton cycle containment. In fact it will be shown that in some cases it is possible to obtain interesting results using relations between $G(n, m, p)$ and random graph with independent edges, despite the fact that two models differ by a lot.