

SPANNING STRUCTURES AND UNIVERSALITY IN SPARSE RANDOM HYPERGRAPHS

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ABSTRACT. Finding spanning subgraphs is a well studied problem in random graph theory, in the case of hypergraphs less is known and it is natural to study the corresponding spanning problems for random hypergraphs. We adapt a general result of Riordan from random graphs to random r -uniform hypergraphs $\mathcal{H}^{(r)}(n, p)$ and discuss some examples.

Moreover, we study universality, i.e. when does an r -uniform hypergraph contain *any* hypergraph on n vertices and with maximum vertex degree bounded by Δ ? For $\mathcal{H}^{(r)}(n, p)$ we show that this holds for $p = \omega\left((\ln n/n)^{1/\Delta}\right)$ a.a.s. Furthermore we derive from explicit constructions of universal graphs due to Alon, Capalbo constructions of universal hypergraphs of size almost matching the lower bound $\Omega(n^{r-r/\Delta})$.

This is joint work with Samuel Hetterich and Yury Person.