SPANNING STRUCTURES AND UNIVERSALITY IN SPARSE RANDOM HYPERGRAPHS

OLAF PARCZYK

carcyk@math.uni-frankfurt.de

Institute of Mathematics, Goethe University Frankfurt

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 \(\Delta\)? For \(\mathcal{H}(r)(n, p)\) we show that this holds for \(p = \omega \left( \left( \ln n / n \right)^{1/\Delta} \right) \) 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 \(\Omega(n^{r-\Delta})\).

This is joint work with Samuel Hetterich and Yury Person.