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Embedding nearly-spanning bounded degree trees

We derive a sufficient condition for a sparse graph G on n vertices to contain a copy of a tree T of maximum degree at most d on $(1-\epsilon)n$ vertices, in terms of the expansion properties of G. As a result we show that for fixed $d \geq 2$ and $0 < \epsilon < 1$, there exists a constant $c = c(d, \epsilon)$ such that a random graph $G(n, c/n)$ contains almost surely a copy of every tree T on $(1-\epsilon)n$ vertices with maximum degree at most d.

We also prove that if an (n, D, λ)-graph G (*i.e.*, a D-regular graph on n vertices all of whose eigenvalues, except the first one, are at most λ in their absolute values) has large enough spectral gap D/λ as a function of d and ϵ, then G has a copy of every tree T as above.

Joint work with Noga Alon and Michael Krivelevich.