Spanning subgraphs in uniformly dense and inseparable graphs

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Abstract: We consider sufficient conditions for the existence of k-th powers of Hamiltonian cycles in n-vertex graphs G with minimum degree cn for arbitrarily small c > 0. About 20 years ago Komlós, Sarkozy, and Szemerédi resolved the conjectures of Psa and Seymour and obtained optimal minimum degree conditions for this problem by showing that c=k/(k+1) suffices for large n. For smaller values of c the given graph G must satisfy additional assumptions. We show that inducing subgraphs of density d>0 on linear subsets of vertices and being inseparable, in the sense that every cut has density at least c, are sufficient assumptions for this problem and, in fact, for a variant of the bandwidth theorem. This generalises recent results of Staden and Treglown.

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