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A pair-degree condition for Hamiltonian cycles in 3-graphs

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Abstract: For graphs, the fundamental theorem by Dirac ensuring the existence of Hamiltonian cycles in a graph G with large minimum degree was generalised by Chvatal to a characterisation of those degree sequences that force a graph to have a Hamiltonian cycle. After a Dirac-like result was proved for 3-uniform hypergraphs by Rodl, Rucinski, and Szemeredi, we will discuss a first step towards a more general characterisation of pair degree matrices of 3-uniform hypergraphs that force Hamiltonicity. The presented result can be seen as a 3-uniform analogue of a result on graphs by Posa that is more general than Dirac's and is generalised by Chvatal's theorem. In particular we will prove that for each c ¿ 0 there exists an n such that the following holds: If H is a 3-uniform hypergraph with vertex set 1,...,n and d(i,j) ¿ min (i+j)/2, n/2 + cn holds for all pairs of vertices, then H contains a tight Hamilton cycle.

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