

## FAMILIES OF TRIPLES WITH HIGH MINIMUM DEGREE ARE HAMILTONIAN

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### Abstract

In this paper we show that every family of triples, that is, a 3-uniform hypergraph, with minimum degree at least  $(\frac{5-\sqrt{5}}{3} + \gamma)\binom{n-1}{2}$  contains a tight Hamiltonian cycle.

**Keywords:** 3-uniform hypergraph, Hamilton cycle, minimum vertex degree.

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### REFERENCES

- [1] R. Aharoni, A. Georgakopoulos and P. Sprüssel, *Perfect matchings in r-partite r-graphs*, European J. Combin. **30** (2009) 39–42.  
doi:10.1016/j.ejc.2008.02.011
- [2] E. Buss, H. Hàn and M. Schacht, *Minimum vertex degree conditions for loose Hamilton cycles in 3-uniform hypergraphs*, J. Combin. Theory (B), to appear.

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- [3] R. Glebov, Y. Person and W. Webs, *On extremal hypergraphs for hamiltonian cycles*, European J. Combin. **33** (2012) 544–555 (An extended abstract has appeared in the Proceedings of EuroComb 2011).  
doi:10.1016/j.ejc.2011.10.003
- [4] H. H n, Y. Person and M. Schacht, *On perfect matchings in uniform hypergraphs with large minimum vertex degree*, SIAM J. Discrete Math. **23** (2009) 732–748.  
doi:10.1137/080729657
- [5] H. H n and M. Schacht, *Dirac-type results for loose Hamilton cycles in uniform hypergraphs*, J. Combin. Theory (B) **100** (2010) 332–346.  
doi:10.1016/j.jctb.2009.10.002
- [6] S. Janson, T. Luczak and A. Ruci ski, Random Graphs (John Wiley and Sons, New York, 2000).  
doi:10.1002/9781118032718
- [7] G.Y. Katona and H.A. Kierstead, *Hamiltonian chains in hypergraphs*, J. Graph Theory **30** (1999) 205–212.  
doi:10.1002/(SICI)1097-0118(199903)30:3<205::AID-JGT5>3.0.CO;2-O
- [8] P. Keevash, D. K hn, R. Mycroft and D. Osthus, *Loose Hamilton cycles in hypergraphs*, Discrete Math. **311** (2011) 544–559.  
doi:10.1016/j.disc.2010.11.013
- [9] I. Khan, *Perfect matching in 3-uniform hypergraphs with large vertex degree*, SIAM J. Discrete Math. **27** (2013) 1021–1039.  
doi:10.1137/10080796X
- [10] D. K hn, R. Mycroft and D. Osthus, *Hamilton l-cycles in uniform hypergraphs*, J. Combin. Theory (A) **117** (2010) 910–927.  
doi:10.1016/j.jcta.2010.02.010
- [11] D. K hn and D. Osthus, *Matchings in hypergraphs of large minimum degree*, J. Graph Theory **51** (2006) 269–280.  
doi:10.1002/jgt.20139
- [12] D. K hn and D. Osthus, *Loose Hamilton cycles in 3-uniform hypergraphs of high minimum degree*, J. Combin. Theory (B) **96** (2006) 767–821.  
doi:10.1016/j.jctb.2006.02.004
- [13] D. K hn, D. Osthus and A. Treglown, *Matchings in 3-uniform hypergraphs*, J. Combin. Theory (B) **103** (2013) 291–305.  
doi:10.1016/j.jctb.2012.11.005
- [14] O. Pikhurko, *Perfect matchings and  $K_4^3$ -tilings in hypergraphs of large codegree*, Graphs Combin. **24** (2008) 391–404.  
doi:10.1007/s00373-008-0787-7
- [15] V. R dl and A. Ruci ski, *Dirac-type questions for hypergraphs—a survey (or more problems for Endre to solve)*, An Irregular Mind (Szemer di is 70), Bolyai Soc. Math. Stud. **21** (2010) 561–590.

- [16] V. Rödl, A. Ruciński and E. Szemerédi, *A Dirac-type theorem for 3-uniform hypergraphs*, Combin. Probab. Comput. **15** (2006) 229–251.  
doi:10.1017/S0963548305007042
- [17] V. Rödl, A. Ruciński and E. Szemerédi, *Perfect matchings in uniform hypergraphs with large minimum degree*, European. J. Combin. **27** (2006) 1333–1349.  
doi:10.1016/j.ejc.2006.05.008
- [18] V. Rödl, A. Ruciński and E. Szemerédi, *An approximate Dirac-type theorem for  $k$ -uniform hypergraphs*, Combinatorica **28** (2008) 229–260.  
doi:10.1007/s00493-008-2295-z
- [19] V. Rödl, A. Ruciński and E. Szemerédi, *Perfect matchings in large uniform hypergraphs with large minimum collective degree*, J. Combin. Theory (A) **116** (2009) 613–636.  
doi:10.1016/j.jcta.2008.10.002
- [20] V. Rödl, A. Ruciński and E. Szemerédi, *Dirac-type conditions for hamiltonian paths and cycles in 3-uniform hypergraphs*, Adv. Math. **227** (2011) 1225–1299.  
doi:10.1016/j.aim.2011.03.007
- [21] V. Rödl, A. Ruciński, M. Schacht and E. Szemerédi, *A note on perfect matchings in uniform hypergraphs with large minimum collective degree*, Comment. Math. Univ. Carolin. **49** (2008) 633–636.

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