

NOTE

## ALMOST SELF-COMPLEMENTARY UNIFORM HYPERGRAPHS<sup>1</sup>

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### Abstract

A  $k$ -uniform hypergraph ( $k$ -hypergraph) is *almost self-complementary* if it is isomorphic with its complement in the complete  $k$ -uniform hypergraph minus one edge. We prove that an almost self-complementary  $k$ -hypergraph of order  $n$  exists if and only if  $\binom{n}{k}$  is odd.

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#### REFERENCES

- [1] C.R.J. Clapham, *Graphs self-complementary in  $K_n - e$* , Discrete Math. **81** (1990) 229–235.  
doi:10.1016/0012-365X(90)90062-M
- [2] J.W.L. Glaisher, *On the residue of a binomial coefficient with respect to a prime modulus*, Quart. J. Math. **30** (1899) 150–156.
- [3] L.N. Kamble, C.M. Deshpande and B.Y. Bam, *Almost self-complementary 3-uniform hypergraphs*, Discuss. Math. Graph Theory **37** (2017) 131–140.  
doi:10.7151/dmgt.1919
- [4] S.H. Kimball, T.R. Hatcher, J.A. Riley and L. Moser, *Solution to problem E1288 : Odd binomial coefficients*, Amer. Math. Monthly **65** (1958) 368–369.  
doi:10.2307/2308812
- [5] E.E. Kummer, *Über die Ergänzungssätze zu den allgemeinen Reciprocitätsgesetzen*, J. Reine Angew. Math. **44** (1852) 93–146.  
doi:10.1515/crll.1852.44.93
- [6] E. Lucas, *Sur les congruences des nombres eulériens et des coefficients différentiels*, Bull. Soc. Math. France **6** (1878) 49–54.  
doi:10.24033/bsmf.127
- [7] G. Ringenboim, *Fermat’s Last Theorem for Amateurs* (Springer Verlag, 1999).
- [8] A. Szymański and A.P. Wojda, *A note on  $k$ -uniform self-complementary hypergraphs of given order*, Discuss. Math. Graph Theory **29** (2009) 199–202.  
doi:10.7151/dmgt.1440
- [9] A.P. Wojda, *Self-complementary hypergraphs*, Discuss. Math. Graph Theory **26** (2006) 217–224.  
doi:10.7151/dmgt.1314

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