

THE EXISTENCE OF QUASI REGULAR AND BI-REGULAR SELF-COMPLEMENTARY 3-UNIFORM HYPERGRAPHS

LATA N. KAMBLE

Department of Mathematics
Abasaheb Garware College,
Karve Road, Pune-411004

e-mail: lata7429@gmail.com

CHARUSHEELA M. DESHPANDE

AND

BHAGYASHREE Y. BAM

Department of Mathematics
College of Engineering Pune
Pune-411006

e-mail: dcm.maths@coep.ac.in

Abstract

A k -uniform hypergraph $H = (V; E)$ is called self-complementary if there is a permutation $\sigma : V \rightarrow V$, called a complementing permutation, such that for every k -subset e of V , $e \in E$ if and only if $\sigma(e) \notin E$. In other words, H is isomorphic with $H' = (V; V^{(k)} - E)$. In this paper we define a bi-regular hypergraph and prove that there exists a bi-regular self-complementary 3-uniform hypergraph on n vertices if and only if n is congruent to 0 or 2 modulo 4. We also prove that there exists a quasi regular self-complementary 3-uniform hypergraph on n vertices if and only if n is congruent to 0 modulo 4.

Keywords: self-complementary hypergraph, uniform hypergraph, regular hypergraph, quasi regular hypergraph, bi-regular hypergraph.

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