

Generalized Hadamard Matrices and Generalized Hadamard Graphs

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Hadamard matrices and their applications have steadily and rapidly grown during the last two decades. Due to that many researchers have developed various concepts on Hadamard matrices. A $v \times v$ matrix $M = [m_{ij}]$ with entries from multiplicative group C of order w where v is divisible by w is a *generalized Hadamard matrix*, denoted by $GH(w, v/w)$ over C , if for all $i \neq j$, the sequence of quotients $m_{ij}m_{jk}^{-1}$, $1 \leq k \leq v$, contains each element of C exactly v/w times. This talk is concerned with a set of generalization of Hadamard matrices of order p^n over the cyclic group C_p , where p is prime which are generated using the properties of Latin squares. We introduce generalised Hadamard graphs which are constructed using generalized Hadamard matrices. In particular, we show that the generalized Hadamard graphs are p^n -regular. Our results are illustrated by constructing p^n -regular graphs for different values of p and n .