

Unbiased Hadamard matrices

Hadi Kharaghani

*University of Lethbridge
Lethbridge, Alberta, Canada
(kharaghani@uleth.ca)*

Abstract

A *Hadamard* matrix is a matrix H of order n with entries in $\{-1, 1\}$ and orthogonal rows. Two Hadamard matrices H and K of order n are called *unbiased* if $HK^t = \sqrt{n}L$, where K^t denotes the transpose of the matrix H and L is a Hadamard matrix of order n . The class of mutually unbiased Hadamard matrices will be discussed. We find a sharp lower bound for the number of mutually unbiased Hadamard matrices of order $16n^2$, assuming the existence of a Hadamard matrix of order $4n$. We conclude the talk by discussing some applications of $(0, 1)$ -matrices resulting from certain class of mutually unbiased Hadamard matrices.