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**Stephen London** (london@math.uic.edu) and **Vera Pless\*** (pless@math.uic.edu). *Hadamard Matrices*. Preliminary report.

Hadamard matrices are an intriguing subject which has been studied for well over a century. We begin by giving some simple constructions including the Sylvester, Kronecker product, Paley, Williamson, Baumert Hall and Goethals-Seidel constructions.

A difficult problem is determining when two Hadamards are equivalent. We discuss some methods of determining inequivalence; namely k-profiles, automorphism groups and the Hamming distance distribution.

We show how to enumerate the Hadamard matrices up to order 24 using a computer program with backtracking and the above methods.

We describe ways of finding Hadamard matrices for larger orders including recent techniques. Finally, we discuss the current state of the famous Hadamard conjecture. (Received July 27, 2007)