

# ON THE CONSTRUCTION OF ORDER SIX MULTILEVEL HADAMARD MATRICES

**Keli Parker**

Department of Mathematics and Statistics, Wright State University  
Dayton, Ohio 45435 USA  
e-mail: [parker.132@wright.edu](mailto:parker.132@wright.edu)

## **Abstract**

The existence of multilevel Hadamard matrices (MHMs) of all orders as well as a construction for full-rate circulant MHMs of all orders  $n \neq 4$  is known. We use computer search methods to look for previously unknown full-rate circulant MHMs of orders 5, 6, and 7 and find solutions that potentially do not follow from the known construction. We then give an alternate construction to explain some order six MHMs.

**Key words and phrases:** multilevel Hadamard matrices, full-rate circulant matrix.  
**AMS (MOS) Subject Classifications:** 05B20