

## A TECHNIQUE FOR COMPUTING MINORS OF BINARY HADAMARD MATRICES AND APPLICATION TO THE GROWTH PROBLEM\*

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**Abstract.** A technique to compute all the possible minors of order  $n - j$  of binary Hadamard matrices with entries  $(0, 1)$  is introduced. The method exploits the properties of such matrices  $S$  and also the symmetry and special block structure appearing when one forms the matrix  $D^T D$ , where  $D$  is a submatrix of  $S$ . Theoretically, the method works for every pair of values  $n$  and  $j$  and provides general analytical formulae. The whole process can be standardized and implemented as a computer algorithm. The usefulness of such a method is justified by the application to the growth problem. This study gives also more insight into some structural properties of these matrices and leads to the formulation of the growth conjecture for binary Hadamard matrices.

**Key words.** Binary Hadamard matrices, determinant calculus, symbolic computations, Gaussian elimination, growth problem.

**AMS subject classifications.** 15A15, 05B20, 65F40, 65F05, 65G50.

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