

UNIVERSITY OF PUERTO RICO  
FACULTY OF NATURAL SCIENCES  
DEPARTMENT OF MATHEMATICS

# On a system of numeration applicable to the middle two levels of the Boolean lattice

Dr. Italo J. Dejter  
University of Puerto Rico  
Rio Piedras, PR 00936-8377

## Abstract

Let  $0 < k \in \mathbb{Z}$  and let  $M_k$  be the subgraph of the Hasse diagram of the Boolean lattice on  $2k + 1$  elements induced by the  $k$ - and  $(k + 1)$ -levels. The introduction of a system of numeration composed by certain integer strings and such that the  $k$ -th Catalan number  $C_k = \binom{2k+1}{k}/(2k+1)$  is expressed by means of the string  $10 \cdots 0$ , with exactly  $k$  zeros, permits the linear ordering of the vertex set of a folding of a quotient graph of  $M_k$ . This ordering further reveals two extremal approaches to Hável's conjecture on the existence of Hamilton cycles in the  $M_k$ s.

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