

THE DEHN–SOMMERVILLE RELATIONS AND THE CATALAN MATROID

Nicole Yamzon

San Francisco State University, United States

nyamzon@mail.sfsu.edu

The f -vector of a d -dimensional polytope P stores the number of faces of each dimension. When P is simplicial the Dehn–Sommerville relations imply that to determine the f -vector of P , we only need to know approximately half of its entries. This raises the question: Which $(\lceil \frac{d+1}{2} \rceil)$ -subsets of the f -vector of a general simplicial polytope are sufficient to determine the whole f -vector? We prove that the answer is given by the bases of the Catalan matroid.

Joint work with Anastasia Chavez (University of California at Berkeley).