

Equivalence Classes of Full-Dimensional 0/1-Polytopes with Many Vertices

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Abstract: Let Q_n denote the n -dimensional hypercube with the vertex set $V_n = \{0, 1\}^n$. A 0/1-polytope of Q_n is a convex hull of a subset of V_n . This paper is concerned with the enumeration of equivalence classes of full-dimensional 0/1-polytopes under the symmetries of the hypercube. With the aid of a computer program, Aichholzer completed the enumeration of equivalence classes of full-dimensional 0/1-polytopes for Q_4 , Q_5 , and those of Q_6 up to 12 vertices. In this paper, we present a method to compute the number of equivalence classes of full-dimensional 0/1-polytopes of Q_n with more than 2^{n-3} vertices. As an application, we finish the counting of equivalence classes of full-dimensional 0/1-polytopes of Q_6 with more than 12 vertices.

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Keywords: n -cube, full-dimensional 0/1-polytope, symmetry, hyperplane, Pólya theory.

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