

Combinatorial 2-truncated cubes.

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Abstract

The work is devoted to the family of combinatorial polytopes that can be obtained from a cube by sequence of truncations of codimension 2 faces (below called truncated cubes). Every 2-truncated cube P is a flag simple polytope and it was shown that there exists a flag simplicial complex Δ_P such that $f(\Delta_P) = \gamma(P)$. Therefore, γ -vectors of 2-truncated cubes satisfy Frankl-Furedi-Kalai inequalities. The class of 2-truncated cubes include many well-known classes of simple polytopes (flag nestohedra, graph-associahedra and graph-cubeahedra). It was shown that γ -, g -, h -, f -vectors of associahedra, cyclohedra, permutohedra and stellohedra are the sharp bounds for γ -, g -, h -, f -vectors of certain subclasses of graph-associahedra.