Mathematics > Combinatorics

Sweeping the cd-Index and the Toric h-Vector

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We derive formulas for the cd-index and the toric h-vector of a convex polytope P from a sweeping by a hyperplane. These arise from interpreting the corresponding S-shelling of the dual of P. We describe a partition of the faces of the complete truncation of P to reflect explicitly the nonnegativity of its cd-index and what its components are counting. One corollary is a quick way to compute the toric h-vector directly from the cd-index. We also propose an "extended toric" h-vector that fully captures the information in the flag h-vector.

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