A Gray Code for the Shelling Types
of the Boundary of a Hypercube

Sarah Birdsong and Gábor Hetyei,

Abstract

We consider two shellings of the boundary of the hypercube equivalent if one can be transformed into the other by an isometry of the cube. We observe that a class of indecomposable permutations, bijectively equivalent to standard double occurrence words, may be used to encode one representative from each equivalence class of the shellings of the boundary of the hypercube. These permutations thus encode the shelling types of the boundary of the hypercube. We construct an adjacent transposition Gray code for this class of permutations. Our result is a signed variant of King's result showing that there is a transposition Gray code for indecomposable permutations.

Department of Mathematics, UNC Charlotte, Charlotte, NC 28223