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*Induced 2-Gray codes inside the Binary Reflected Gray Code*

A 2-BRGC language is a set of binary strings which satisfies two closure properties: (1) Flip the leftmost 1 produce a string in the set; and (2) Swap the leftmost 1 with the bit on the right produce a string in the set. Examples of 2-BRGC languages include binary strings, binary necklaces and prenecklaces, and prefix normal words. We prove that strings in any 2-BRGC language appear as a cyclic 2-Gray code when listed in binary reflected Gray code (BRGC) order. We also provide a generic successor rule that computes the next string of a 2-BRGC language in BRGC order.