MEGAN DEWAR, Government of Canada

Monotone Gray Codes for vectors of the form $[-m, m]^k$ *and* $[0, m]^k$

We consider ordering k-dimensional vectors having integer coordinates so that consecutive vectors differ by a minimal change. We define a monotone adjacent change Gray code for vectors having integer coordinates to be a listing of the vectors such that consecutive vectors differ in a single position by $+1$ or -1 and such that the vectors appear in order from smallest to largest L_∞ norm. This is a generalization of Savage and Winkler's definition of monotone binary Gray codes. We prove, by construction, the existence of monotone adjacent change Gray codes for $[0, m]^k$, for all $m, k \in \mathbb{N}$, and the existence of monotone adjacent change Gray codes for $[-m, m]^k$, for all $m, k \in \mathbb{N}$, k even. Furthermore, we show that monotone adjacent change Gray codes for $[-m, m]^k$ do not exist when k is odd.