

# On Automorphisms of Order Three of a Putative [72, 36, 16] Binary Self-Dual Code

Vassil Yorgov

*Department of Mathematics and Computer Science, Fayetteville State University, Fayetteville, NC 28311*

`vyorgov@uncfsu.edu`

The existence of a [72, 36, 16] binary self-dual code,  $C$ , is a long standing open problem. It is known that if  $C$  exists, then the order of its automorphism group is at most five. We assume that  $C$  has automorphism  $\sigma$  of order three. Let  $F$  be the subspace of vectors in  $C$  fixed by  $\sigma$  and let  $E$  be the subspace of vectors in  $C$  having even weight on each cycle of  $\sigma$ . Then  $C = F \oplus E$ , the natural projection of  $F$  is the [24, 12, 8] Golay code, and  $E$  is an Hermitian self-dual code of length 24 over the field with four elements  $\{0, e, \omega, \omega^2\}$  where  $\omega + \omega^2 = e$ ,  $e^2 = e$ . We show that  $E$  does not have a generator matrix with entries from  $\{0, e\}$ .