A methodology for constructing the basis of a putative $[72,36,16]$ extremal code for a given automorphism group

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Self-dual doubly even linear binary error-correcting codes, often referred to as type II codes, are codes closely related to many combinatorial structures such as 5-designs. Extremal codes are codes that have the largest possible minimum distance for a given length and dimension. The existence of the extremal $[72,36,16]$ type II code is still open. Previous results show that the automorphism group of a putative code $C$ with the aforementioned properties has order 5 or dividing 24. In this paper, we present a method and the results of a surprisingly simple exhaustive search showing that such a code $C$ cannot admit an automorphism of order 6.

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