Codes over local rings of order 16 and their Gray maps

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Abstract

Weight preserving Gray maps are defined from any non-chain local ring of order 16 to the binary Hamming space. This is used to define the Lee weight for codes in this setting. MacWilliams relations for the weight enumerator with respect to the Lee weight are given. Self-dual codes are studied over these rings and they are used to study binary codes whose weight enumerators are held invariant by the action of the MacWilliams relations.