

# Linear Codes over $\frac{\mathbb{Z}_4[x]}{\langle x^2-2x \rangle}$ : Dual Preserving Maps and Images as Codes over $\mathbb{Z}_4$

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The most general class of rings to considered working on coding theory over are Frobenius rings. Since finite commutative Frobenius rings are isomorphic to a direct sum of local Frobenius rings, it is important to understand local Frobenius rings. Chain rings have been extensively studied which are examples of local Frobenius rings. There are however non-chain examples as well. These local Frobenius non-chain rings have not garnered much attention until recently. We consider linear codes over  $\frac{\mathbb{Z}_4[x]}{\langle x^2+2x \rangle}$ , which is one of the seven local Frobenius non-chain rings of order 16. Order 16 is of importance since there are no local Frobenius rings of smaller order that are not chain rings. A dual preserving map is presented along with a characterization of  $\mathbb{Z}_4$  linear codes that are images of a codes over  $\frac{\mathbb{Z}_4[x]}{\langle x^2+2x \rangle}$ .

## Keywords

Frobenius rings, codes over rings, local rings

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