Ph.D. Thesis Presentation

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Steganography using perfect codes over Cayley graphs based on various lattices

Abstract

The main purpose of this talk is to present how to design general methods for constructions of steganographic schemes using the codes in Abelian Cayley graphs containing perfect codes. Steganography is the science of communicating a secret message by hiding it in a cover object. We review the notion of Cayley graphs, some its examples and also introduce trends of steganography. Then we insist on that a perfect code on an Abelian Cayley graph produces a proper steganographic scheme.

It has been an interesting research problem to construct other steganographic schemes from mathematically structured graphs. In some cases, Cayley graphs based on Gaussian integers, Eisenstein-Jacobi integers and Lipschitz integers, respectively - could contain surprisingly concrete steganographic schemes. When there exist 1-perfect codes on these Cayley graphs, they became vertex rainbow graphs so that steganographic schemes could be designed on them by using explicit embedding and recovering functions. We also compute and show values of many of parameters on these schemes such as cover length, embedding capacity, embedding radius, average number of embedding changes, relative payload, change rate, embedding efficiency, and lower embedding efficiency, etc.

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