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Matrix methods to construct De Bruijn Tori and Families

A de Bruijn torus is a two dimensional extension of a de Bruijn sequence. While methods exist to generate these tori, only a few such methods are known. One method involves using a generalization of de Bruijn sequences known as de Brujin families, however generation of these de Bruijn families is difficult. We have developed a novel method to generate de Bruijn families for an arbitrary alphabet and window size using certain matrices over finite fields known as Affine Shifters.

In this talk, we describe this novel generation method. We will also give an analysis on limitations with this generation method. Time permitting, we will describe their extension in generating de Bruijn families of higher dimension.