**Aim of the Study**

- Constructing LCD Codes and their generator matrices with the k-cover technique.
- Studying and establishing the boundaries between the parameters n, k, and d for LCD Codes.
- There are many tables\(^1\) for linear codes over \(F_q\), but no table for LCD codes over \(F_2\). So, we want to create an up to date table for largest minimum distance among all binary LCD \([n,k,d]\)-codes.
- For every LCD \([n,k,d]\)-codes, we want to give the generator matrices and observing the \(d\) parameter boundaries with the fixed given \(n\) and \(k\) parameters.

**Largest Minimum Distance of Binary LCD \([n,k,d]\)-Codes**

Here you can see the color coded table for binary LCD \([n,k,d]\)-Codes. For any \(n\) and \(k\) (less than 24) values, the table provides us the best \(d\) parameter possible. Colors here references to the articles that we used to create the table.

**Example:** Let \(C\) be a binary \([8,2,5]\) LCD code. Let \(G\) be a generator matrix for \(C\).

\[
G = \begin{bmatrix}
1 & 1 & 1 & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 1 & 1 & 1
\end{bmatrix}
\]

Since \(\text{det}(G^T) = 1\), this linear code is indeed a binary LCD code with parameters \([8,2,5]\).

Then, from \(G\), \(C\) has the following elements.

\[C = \{00000000 , 00011111 , 11111000 , 11100111\}\]

- \(d(00000000 , 00011111) = 5\)
- \(d(00000000 , 11111000) = 5\)
- \(d(00000000 , 11100111) = 6\)
- \(d(11111000 , 00011111) = 5\)
- \(d(11111000 , 11100111) = 5\)
- \(d(00011111 , 11100111) = 5\)

So, the minimum distance is 5.

**References**

1. 