

## ABSTRACT

Underwater Visible Light Communication (UVLC) is one of the potential developments of Visible Light Communication (VLC) to study its performance. With the development of UVLC, now the VLC system can be implemented in water. However, there are still a number of problems with UVLC, one of which is the communication range as one of the system performance factors that can be overcome using Low Density Parity Check (LDPC) codes which are used as Forward Error Correction (FEC). This study uses Quasi-Cyclic (QC)-LDPC to improve the performance of the UVLC system in clear ocean and coastal ocean water types.

In this final project, an analysis of the performance of FEC using QC-LDPC on the UVLC system has been carried out and then compared with the UVLC system that does not use QC-LDPC to be analyzed using different types of seawater on the LDPC Channel, namely Line of Sight (LOS), so that it can comparing the performance of QC-LDPC between two types of sea water, namely clear ocean and coastal ocean, with test parameters namely Bit Error Rate (BER), Signal to Noise Ratio (SNR), and Transmission Distance.

From the simulation results that have been carried out, it can be concluded that QC-LDPC as a whole is able to increase performance higher by 10% in clear ocean water and 11% increase in coastal ocean water. The maximum distance that can be reached by the system using QC-LDPC is 3.73 meters in clear ocean water, while in coastal ocean QC-LDPC is able to reach 2.92 meters with target BER  $10^{-3}$

**Key Words:** VLC, UVLC, FEC, QC-LDPC, *Bit Flipping*, BER, SNR