

## ABSTRACT

The development of 6G and quantum technology allows the transfer of information transmission in the quantum form to be more widely used. However, research related to data security is still in progress and is limited so it can provide more significant potential for data theft with quantum technology. One of them is the theft of visual information data (images). So we need a data security system that can protect image information in quantum computing. Watermarking is one method that can be used to overcome this. Quantum image watermarking is a data security technique by inserting a watermark on the *host* image in a quantum state which aims to protect the copyright of the image.

This final project proposes an LSB-based quantum image watermarking scheme for copyright protection. In the embedding process, the watermark image is inserted into the host image using the LSB method, then transformed into a quantum state. In the extraction process, value detection is carried out on the watermark image to extract the inserted watermark.

The results of this study obtained an average PSNR value of 51 dB and an SSIM value of 0.9999. The size  $2 \times 2$  and size  $4 \times 4$  blocks do not affect the obtained PSNR and SSIM values. When not given an attack, the extracted BER and PSNR watermark get BER 0 and PSNR value to infinity. When given an attack, the best BER, PSNR, and SSIM values are obtained when given a noise CNOT attack.

**Keywords:** Quantum Image Watermarking, Least Significant Bit, Quantum Image Processing.