

## **ABSTRACT**

*Audio Watermarking is one of the technologies used to protect copyright and audio data by inserting data or digital information containing the original identity of the audio owner. This place of inserting data is done by QR on the R matrix, the upper triangular matrix.*

*In this final assignment the authors had designed and analyzed Compressive Sampling (CS) on stereo audio watermarking based on Quantization Index Modulation (QIM) with technical Lifting Wavelet Transform (LWT), Discrete Cossine Transform (DCT), QR Decomposition (QR). The LWT process will produce a lower frequency sub-band then the matrix is transformed from the time domain to the frequency domain by DCT. Each frame of the square matrix DCT will be composed into an orthogonal matrix and a triangular matrix by QR. With QIM a watermark is inserted by quantizing the data to a value corresponding to the quantizer contained in the watermark.*

*The result of this design combination is the best parameter on the MP4 compression attack with  $ODG = -3.1825$ ,  $SNR = 31.4034$   $BER = 0$  and  $C = 615.2344$ . Produce good resilience after tested with various attacks with average value of BER before optimization 0.35938 and after optimized to 0.218439.*

**Keywords:** *Audio Watermarking, Compressive Sampling (CS), Quantization Index Modulation (QIM), Lifting Wavelet Transform (LWT), Discrete Cossine Transform (DCT), QR Decomposition (QR)*