ABSTRACT

This research has been done analysis of audio watermarking by using wavelet transform method Lifting Wavelet Transform (LWT), QR Decomposition method and Compressive Sensing (CS) on watermark. LWT is a technique to decompose signal into 2 sub-bands, that is low and high sub-band. Hosts who have done LWT then done QR Decomposition on sub-band low. QR Decomposition works by factoring a matrix which is the multiplication of two matrices of the matrix Q and R, in which case a low sub-band inserted on the first row of the matrix R. CS works by inserting a watermark into the compressive measurement vector, and its function is to compress the watermark in order to have a simpler form before it is inserted into the host.

*Audio watermarking is done using audio files with *.wav format that has a duration of 10 seconds and use 3 genres of music, that is Jazz, Folk, and Rock. The embedded watermark is a black-and-white image with *., and uses 2 different images of each 16x16 and 32x32 pixel. Subjective test is done by survey to at least 30 correspondents by listening to audio that has been inserted watermark, and objective test by measuring the value of SNR, ODG, BER, and PSNR. Audio that has been inserted watermark tested its resistance with given 5 kinds of attacks such as LPF, BPF, HPF, MP3 Compression, and Noise. The optimum result obtained in this Final Project is having value of SNR 90.75 dB, ODG -6.93E-10, BER 0, and PSNR ∞, that is at Host Jazz watermark 1 size 16x16 pixel and measurement rate 0.02 without attack.. This method is resistant to LPF, MP3 compression, and Noise attacks. And the average MOS value obtained from the survey of 60 correspondents is 4.23.*

Keywords* : *Audio Watermarking, Compressive Sensing, QR Decomposition, Lifting Wavelet Transform.