

## ABSTRACT

*The development of information and communication technology that is rapidly increasing makes it easy for someone to access, process, and disseminate information. This has several negative impacts, one of that is piracy or illegally retrieving and modifying data belonging to someone else. To overcome these problems, we need a technology called watermarking by inserting information into digital media to protect its authenticity and copyright.*

*In this final project, an audio watermarking system is designed based on DWT with Hybrid Statistical Mean Manipulation (SMM) and Spread Spectrum (SS) methods. The design of this audio watermarking system uses the audio signal decomposition by DWT to produce audio signals with low-frequency subband and high-frequency subband. The embedding process using the SMM method is the insertion process by calculating the average in the audio signal in one frame and used for low-frequency subband. Whereas in the high-frequency subband, the SS method is used by inserting audio data with randomized Pseudo Noise (PN) Sequences for making them more difficult to detect.*

*The results of this design produces BER value of 0.1502, SNR value of 34.9 dB, ODG value of -2.494, MOS value of 4.15, and C value of 1.3456 bps. The proposed design is robust against LPF, resampling, equalizer, echo, MP3, AAC, MP4, AC3 compression, and delay attacks.*

**Keywords:** *Watermarking, Audio Watermarking, Discrete Wavelet Transform, Statistical Mean Manipulation, Spread Spectrum.*