

ABSTRACT

Modulation Recognition is a sub-system on the radio receiver device which requires the ability to identify radio signals. It is important because the basic function of signal modulation schemes recognition is to recognize the coming signal modulation schemes. By applying a software that are able to work better than the traditional hardware, radio technology offers potential solution for interoperability, flexible and dynamic network, and reducing operational cost.

Modulation recognition should be able to classify the modulation scheme of the received signal correctly, even in the condition of disturbance channel. The issue in this study are how to develop the modulation recognition system so that its recognition accuracy improves. The algorithm of digital modulations scheme's detection used in this project was a combination of Complex Shannon Wavelet Transformation and Statistical Method of feature extraction. The Decision part used theoretic decision (tree diagram) based on optimum threshold value. The modulated digitals which were detected were QPSKs, 16QAM and 64QAM. The multicarrier signal which was detected was OFDM. The algorithm of multicarrier detection used in this project was a correlation method. This method was also used to estimate the symbol length and cyclic prefix length.

The results of the study showed that theoretic decision's performance using combination of optimum threshold Th_1 mean,

Th₄ variance and Th₅ skewness were the best theoretic decision modulation scheme because the level accuracy detection reached 100%. However for 16QAM and 64QAM modulation scheme, this theoretic decision each had an accuracy detection up to ± 90 %. For multicarrier signal detection, autocorrelation method produced the best accurate detection to estimate the length of data of an OFDM symbol with the level of accuracy detection of 100% starting from minimum SNR 0 dB. Finally to estimate the cyclic prefix length, the correlation method was able to reach a maximum detection of 100 % on SNR 18 dB.

Keywords : Modulation Scheme detection, Complex Shannon Wavelet Transformation, Statistical Method, Theoretic decision (Tree Diagram), Correlation