ABSTRACT

Channel impairment and radio standard differences in telecommunication equipment need different hardware to match with the impairment, of course that will be a wasteful hardware. Those hardware components can be integrated into one hardware system with software support, which is called software radio. The goal of software radio is to enhance the functionality of equipment with software rather than hardware.In software radio, modulation must be changed to detect optimum scheme according to the channel condition. That's why the change of modulation and modulation scheme optimization becomes important to develop software radio. The widely used modulation schemes have their own name, and classified as different modulation. They usually have a small number of parameters to be optimized.

This final project will propose general orthogonal modulation model to identify some widely used modulation and to optimize it in order to find the local optimum because of non-Gaussian channel impairment. Local optimum is a condition with the lowest bit error rate. In general, only a local optimum can be considered to keep the optimization problem feasible. The model proposed based on orthonormal vectors which are obtained by multidimensional rotation. In this model, a change of parameters corresponds to a change of modulation. The parameters are simply rotation angles in multidimensional spaces. Some widely used modulation can be represented with this model, for example is BPSK, QPSK and OFDM.

Result of the simulation is that the changes of rotation angle parameter on BPSK, QPSK and OFDM modulation of the proposed model have different BER for each parameter and in certain parameter has the lowest BER or local optimum condition. Performance evaluation from the proposed model shows that the modulations from the proposed model have better performance than modulation by coding gray mapper.