ABSTRACT

Digital systems communication design for acoustic signals underwater applications is a very challenging field due to the very complex nature of the underwater channel. The technology is known as an underwater acoustic response to the challenges of the information signal transmission capability limitations on water media. This is due to electromagnetic and radio waves can't reach long distances in water medium because it will result in a very large damping, while the acoustic signal can reach long distances and speed, although with limited bandwidth.

This final project aims to design such a system, which can effectively resist the channel side effects but still provide sufficient data rate. For this purpose, an in-depth study of the underwater communication channel is done and analyzed. Along with the significant progress that has been made use of multicarrier modulation in the form of orthogonal frequency division multiplexing (OFDM) for high data rate underwater acoustic communications. In this final project, the implementation of OFDM acoustic modem on a single-input single-output modules using fixed-point DSP TMS320C6416 DSP where the core running at 1 GHz.

There are three categories to know characteristic of acoustic modem of OFDM there will show in figure bit error rate versus signal noise ratio. Testing done with transmitted images 40x60 8 bit, implementation in mfile is the best performance with 0.0067 BER value in 32 subcarrier. Implementation in TMS320C6416 and Simulink is the bad performance because of asynchronization sampling rate between device.

Keywords: Underwater communication, QPSK, OFDM, DSK TMS320C6416, BER, SNR.
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