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Pullarao Prasanth Kalangi

Modelling and Simulation of an Underwater Acoustic Communication Channel

*ABSTRACT - Masterthesis*

Underwater acoustic communication is a rapidly growing field of research and engineering. The wave propagation in an underwater sound channel mainly gets affected by channel variations, multipath propagation and Doppler shift which keep lot of hurdles for achieving high data rates and transmission robustness.

Furthermore, the usable bandwidth of an underwater sound channel is typically a few kHz at large distances. In order to achieve high data rates it is natural to employ bandwidth efficient modulation.

Thus we present a reliable simulation environment for underwater acoustic communication applications (reducing the need of sea trails) that models the sound channel by incorporating multipath propagation, surface and bottom reflection coefficients, attenuation, spreading and scattering losses as well as the transmitter/receiver device employing Quadrature Phase-Shift Keying (QPSK) modulation techniques. To express the quality of the simulation tool various simulation results for exemplary scenes are presented.