

UNDERWATER ACOUSTIC CHANNEL ESTIMATION AND ANALYSIS

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ABSTRACT

This paper analyzes statistical characteristics of underwater acoustic channels using experimental measurements. Channel impulse responses (CIRs) are estimated in the time domain using a least square method with sliding windows applied to received data. The probability density functions (PDF) of the real part, imaginary part, magnitude, and phase of the CIR are estimated, and the two-sample Kolmogorov-Smirnov test is used to determine how well the magnitude PDF fits the Gamma, Rayleigh, and compound K distributions. The autocorrelation, channel coherence time, and level crossing rate of the channel are also investigated. The experimental results demonstrate that underwater channels often offer poorer communication quality than Rayleigh fading channels.