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A Study of Underwater Sound Source Localization.

ABSTRACT - Masterthesis

This thesis aims to analyze underwater sound source localization using localization approaches based on multiple receivers of known position in conjunction with time difference of arrival (TDOA) estimates.

For the utilization of an array of receivers, the cosine law, hyperbolic approach and weighted least square approach (Chan algorithm) are analyzed and implemented using MATLAB. For the estimation of the TDOA, the cross-correlation function, the generalized cross-correlation function and the phase of the complex envelope are utilized.

Based on the experimental investigations of the above algorithms using a well-defined signal for simulation, the method for TDOA estimation which is most precise is found out such that the localization approaches can be applied under reliable accuracy conditions.

After the extensive simulations of different sound source localization techniques, the advantages and disadvantages of each approach are summarized.