

# AUV POSITIONING WITH SIMULTANEOUS PROCESSING OF SAVE AND CURRENT RANGES TO LESS THAN THREE ACOUSTIC BEACONS

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The paper presents a recursive algorithm for determining the coordinates of an autonomous underwater vehicle (AUV) using time-different ranges to the acoustic beacons with log and heading indicator aiding with unknown a priori coordinates of the underwater vehicle. Any number of beacons can be used simultaneously, but at least at one moment the measurements from minimum three beacons are available. At this moment the initial linearization point is obtained using an approximate analytical method. At all the previous moments the measurements are saved for further processing. The algorithm uses two filters parallelly processing the saved and current measurements. The solutions of the forward-time filter are updated by the backward-time filter data using the dummy measurements. The results of modeling and test this real data are presented, confirming the effectiveness of the developed algorithm.

**Keywords:** Kalman filter, autonomous underwater vehicle, dead reckoning system, Bayesian estimation methods, hydroacoustic beacons.

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