

AN EFFICIENT AND COMPUTATIONALLY ATTRACTIVE LOCALIZATION ALGORITHM UNDER LARGE EQUAL RADIUS SCENARIO

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ABSTRACT

A wide variety of applications have been developed based on source localization in areas like sonar, radar, global positioning system (GPS), wireless sensor networks, emergency response and human-computer interactions. Accurate source localization has gained much research interest in recent years, motivated by the rapidly increasing demand for services and systems that depends on accurate location estimations. We give a review of the basic techniques and positioning methods in the field of source localization. We introduce the Large Equal Radius (LER) scenario based on satellite geolocation problem. Here we propose a computationally friendly and efficient estimator based on TDOA measurements under LER scenario. The performance of the proposed estimator is analyzed, and it's shown theoretically that the position covariance matrices can approach the Cramer-Rao Lower Bound (CRLB) when the LER conditions are sufficiently satisfied. Simulation results are included and assessed by comparing with the CRLB. We also analyze the performance degradation due to the presence of sensor position error, and take them into account in the proposed estimator. The proposed estimator can eventually improve the source location estimate accuracy and reach the CRLB when sensor position errors are small. Theoretical developments are provided and simulations are included to evaluate its localization accuracy.