Public Abstract

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Passive source localization is a commonly used technology which can be applied to many areas. A lot of positioning methods have been derived on this subject, such as time of arrivals (TOAs), time differences of arrival (TDOAs), angle of arrivals (AOAs).
This thesis is mainly based on Chan and Ho's two stage closed form TDOAs source localization method. However, Chan and Ho's method assume the sensor positions are known and all of the sensors are perfectly synchronized.
Three topics that affect the accuracy of the source localization are discussed in this thesis in the presence of sensor position manifold uncertainties, in the presence of clock-bias error and in the presence of both sensor position manifold uncertainties and clock-bias error.
For all of the three topics, we develop an estimator for source localization. Then, we use simulation to analyse the performance of the proposed estimator. The simulation result shows that the proposed method reaches the CRLB performance for both the near-field and distant sources in the small error region. Furthermore, the proposed method has been proven that its performance reaches CRLB theoretically.