MA1-2 **Self-Localization of Three-dimensional Sensor Networks**

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We consider the problem of locating and orienting a heterogeneous network of sensors that deployed in a three-dimensional scene at unknown locations and orientations. The self-localization problem is solved by placing a number of source signals, which in general also have unknown locations, in the scene. A subset of sensors in the network measures the time-of-arrival and local direction-of-arrival of the signal emitted from each source. From these noisy measurements and a measurement uncertainty model we compute the maximum likelihood (ML) sensor locations and orientation estimates. We also compute the Cramer-Rao bound for localization accuracy. We present numerical examples using a mix of acoustic and imaging sensors. The acoustic sensors measure TDOAs of acoustic calibration sources, along with DOA with relatively high uncertainty. The imaging sensors measure DOA only, but with high accuracy.