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Symbiotic principle for multiple tonal or harmonic sound source tracking using a network of Acoustic Vector Sensors

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ABSTRACT

Particle filters are widely used for tracking multiple sound sources in motion without constraints on the form of the probability distributions, even in presence of miss and false detections. One of the main challenges is to overcome the computational complexity limitations of these approaches, caused by the growing number of particles required for achieving good performance in high-dimensional systems. In this paper the principle of *a posteriori* independence is applied to reduce the computational complexity of the particle filtering problem in a passive wireless network of Acoustic Vector Sensors. Doppler and Bearing measurements are applied to split the state vector of the problem in a posteriori independent subspaces, which are handled by independent particle filters with fewer dimensions. The performance of the proposed complexity reduction algorithm is evaluated by computer simulations.