



*sensors*



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## **Advances in Angle-Only Filtering and Tracking in Two and Three Dimensions**

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Two-dimensional bearing-only filtering (BOF) arises in many real-world tracking problems, including underwater tracking using a passive sonar, aircraft surveillance using a passive radar, navigation of a robot using a passive sonar, and undersea exploration of natural resources using sonar. BOF using a single sensor is also a challenging nonlinear filtering problem due to poor observability and the nonlinear measurement model. This filtering problem and associated tracking problem have been studied extensively.

Three-dimensional angle-only filtering (AOF) is a two-dimensional counterpart of BOF. Real-world AOF problems include passive ranging using an infrared search and track (IRST) sensor, passive sonar, passive radar in the presence of jamming, ballistic missile and satellite tracking using a telescope, satellite to satellite passive tracking, and missile guidance using bearing-only seekers. The number of publications in the AOF and angle-only tracking in 3D is rather limited compared with the corresponding problems in 2D.



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