



Recent Advances in Co-Pulsing FDA Radars

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Target localization using frequency diverse array (FDA) radar has recently gained significant research attention [1]. By applying a linear frequency offset (FO) across FDA antennas, a range-angle-dependent beam pattern is created, enabling the joint estimation of range and direction-of-arrival (DoA). Most prior studies on FDA have focused on one-dimensional linear arrays, limiting estimations to azimuth angle and range while neglecting elevation and Doppler velocity, both of which are critical in many applications. There is also growing interest in radar systems that reduce measurements across temporal, Doppler, or spatial signal domains.

We explore FDA in the co-array domain [2] to address these challenges. Specifically, we introduce co-pulsing FDA radar, which utilizes a co-prime L-shaped FDA configuration [3]. Here, co-prime FOs are assigned to the elements of an L-shaped co-prime array, and each element transmits at a non-uniform co-prime pulse repetition interval. This approach significantly enhances the degrees of freedom (DoFs) for target localization in the range-azimuth-elevation-Doppler domain while minimizing time-on-target and transmit spectral usage. Lastly, we present a novel space-time adaptive processing (STAP) technique, termed co-STAP [4], for effective clutter suppression in airborne co-pulsing FDA radar systems.

References

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