Poster Session (P)
Poster Lunch (1)

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A ROTATING LONG BASELINE INTERFEROMETER-BASED ALGORITHM FOR ELAVATION AND AZIMUTH ESTIMATION BASED ON STFT-IRT

Abstract

Rotating long baseline interferometer (RLBI) is widely used for direction-of-arrival (DOA) estimation by measuring the phase difference between the two antennas, which plays an important role in the field of passive location for the space-based radar (SBR). However, conventional RLBI-based methods usually require the high SNR due to the fact that the signal energy distributed at different time slice may not be well utilized. To address this issue, this paper proposes a novel RLBI-based algorithm based on short-time Fourier transform-Inverse Radon transform (STFT-IRT), which can accomplish the DOA estimation including the target's elevation and azimuth angles. In the proposed method, the phase difference is firstly obtained by applying the cross-correlation of the signals propagating between the two antenna channels. Then, according to the phase difference, the time-frequency curve is acquired by using a typical time-frequency analysis method, i.e., short-time Fourier transform (STFT). Consider that this time-frequency trajectory distributed in the STFT domain is a sine-shaped signal, and thus, the inverse Radon transform (IRT) is applied to accumulate this sine-shaped signal into a well-focused peak. Finally, the elevation and azimuth angles of the signal source can be estimated according to the peak position in the IRT domain. Compared with the conventional RLBI-based methods, the proposed algorithm has a better anti-noise performance and a higher DOA estimation precision since it can realize the 2-D signal energy integration via the STFT-IRT. Theoretical analysis and simulation results are provided to validate the effectiveness of the proposed algorithm.