

论文

一种新的混合线性调频雷达信号识别方法

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摘要:

混合线性调频(LFM)雷达信号在实际信号环境中广泛存在, 对其进行识别尤为重要。由于混合LFM信号时频分布有严重的交叉项, 因此提出了一种基于独立成分分析的时频交叉项抑制法。通过盲源分离提取各独立成分, 利用时频分布矩阵的联合对角化法抑制交叉项, 再由各成分信号自项求和重构Wigner-Ville分布, 采用Wigner-Hough识别各LFM成分。分析了Wigner-Hough变换输入信噪比和输出信噪比的关系, 仿真验证了算法的有效性, 得出随着样本点数的增加, 在低信噪比条件下, 能获得好的识别性能的结论。

关键词: 独立成分分析; Wigner-Hough变换; 线性调频信号识别

A New Mixed LFM Signal Recognition Method

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Abstract:

Mixed LFM signal is everywhere in signal environments in practice, it is important to recognize it for electronic intelligence. The cross-terms of Wigner-Ville distribution resulting from mixed signals reduce its resolution. A new approach of eliminating the cross-terms based on independent component analysis is presented. The independent signal components were extracted via blind source separation. The cross-terms were reduced significantly based on joint diagonalisation of the time-frequency distribution matrices. The reconstructed Wigner-Ville distribution has good resolution. Each LFM signal components are recognized from mixed signals using Wigner-Hough transform. The relation between input SNR and output SNR is computed, the simulation results show that the new approach improves recognition performance and WHT can enhance the output SNR when sampling number is increased.

Keywords: independent component analysis(ICA) Wigner-Hough transform(WHT) LFM signal recognition

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