A Communication Signal Recognition Algorithm Based on Holder Coefficient Characteristics

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Abstract : Communication signal modulation recognition technology is one of the key technologies in the field of modern information warfare. At present, communication signal automatic modulation recognition methods are mainly divided into two major categories. One is the maximum likelihood hypothesis testing method based on decision theory, the other is a statistical pattern recognition method based on feature extraction. Now, the most commonly used is a statistical pattern recognition method, which includes feature extraction and classifier design. With the increasingly complex electromagnetic environment of communications, how to effectively extract the features of various signals at low signal-to-noise ratio (SNR) is a hot topic for scholars in various countries. To solve this problem, this paper proposes a feature extraction algorithm for the communication signal based on the improved Holder cloud feature. And the extreme learning machine (ELM) is used which aims at the problem of the real-time in the modern warfare to classify the extracted features. The algorithm extracts the digital features of the improved cloud model without deterministic information in a low SNR environment, and uses the improved cloud model to obtain more stable Holder cloud features and the performance of the algorithm is improved. This algorithm addresses the problem that a simple feature extraction algorithm based on Holder coefficient feature is difficult to recognize at low SNR, and it also has a better recognition accuracy. The results of simulations show that the approach in this paper still has a good classification result at low SNR, even when the SNR is -15dB, the recognition accuracy still reaches 76%.

Keywords : communication signal, feature extraction, Holder coefficient, improved cloud model