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短文与研究通讯

基于示向图分割投影的短波跳频信号检测算法

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摘要：

针对短波信道中跳频信号检测的问题，提出一种利用K-Means聚类对示向图进行分割，并通过图像处理方法来实现对跳频信号检测的算法。采用测向速度快的相关干涉仪测向方法完成宽带信号的示向图生成，然后基于K-Means聚类对示向图进行分割，经过形态学滤波进行预处理后，利用灰度图像处理中的边界投影算法对跳频信号检测。此算法在能检测出跳频信号的同时能粗估计跳频信号的基本参数。仿真结果及性能分析表明，该算法能有效地克服信号带宽内复杂的电磁环境，能有效检测出跳频信号，计算复杂度较低，易于工程实现。

关键词： 信号检测；跳频；相关干涉仪；边界投影；形态学滤波

A Frequency-Hopping Detection Algorithm Based on The Direction Image of Partitioned and Projected

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Abstract:

In response to the problem of Frequency-Hopping detection in the HF channel, the paper proposed an algorithm based on the split directed graph which is clustered by K-Means through the image processing method to achieve frequency hopping signal detection. Using the method of correlation interferometer direction completed the broadband signal to generate a directed graph. Then based on the segmentation directed graph by K-Means algorithm, after morphological filtering, preprocessing, and then using the boundary projection algorithm, detect the Frequency-Hopping signals. This algorithm can detect frequency hopping signals, while the course estimated the basic parameters of the frequency hopping signal. Simulation results and performance analysis shows that the algorithm can effectively overcome the complex electromagnetic environment in the signal bandwidth can effectively detect frequency hopping signal, lower computational complexity, easy to project implementation algorithm.

Keywords: Signal detection Frequency-Hopping signal Correlation interferometer Boundary projection Morphological filtering

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