

电子技术

基于四阶累积量与核Fisher判别分析的 MPSK信号分类方法

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摘要:

提出了一种基于高阶累积量和核Fisher判别分析的MPSK信号自动调制识别方法。该算法选取信号的四阶累积量作为分类特征, 利用核函数的思想把特征向量映射到一个高维空间, 并在高维空间中采用线性Fisher判别分析实现了数字信号的分类。选用了径向基核函数, 使用一对一或一对余多类构造法, 并利用交叉验证网格搜索法优化核函数参数, 构建了快速稳健的多类核Fisher判别分析分类器。计算仿真结果表明, 基于核Fisher判别分析的分类器具有良好的性能, 它与支持向量机的分类精度相当, 且训练时间较短。

关键词: 通信对抗 调制分类 核Fisher判别分析 四阶累积量

MPSK signal classification method based on fourth cumulants and kernel Fisher discriminant analysis

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Abstract:

A new classification method based on kernel Fisher discriminant analysis(KFDA) is used in the MPSK automatic signal classification. The fourth cumulants of the received signals are used as the classification vectors firstly, then the kernel thought is used to map the feature vector to the high dimensional feature space and linear fisher discriminant analysis is applied to signal classification. In order to build an effective and robust KFDA classifier, the radial basis kernel function is selected, one against one or one against rest of multi class classifiers is designed, and a method of parameter selection using cross validating grid is adopted. Through the experiments it can be concluded that compared with the SVM classifier, KFDA can almost get the same classification accuracy and requires less time.

Keywords: communication countermeasure signal classification kernel Fisher discriminant analysis fourth cumulants

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