

短文与研究通讯

加权多维标量接收信号强度定位方法

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摘要:

本文提出了一种利用加权多维标度的基于接收信号强度的定位方法, 利用信号接收强度与目标到接收机距离之间的关系, 将信号接收强度转化为距离, 利用多维标度框架对辐射源定位问题进行建模, 对多维标度矩阵进行子空间分解, 根据信号子空间与噪声子空间的正交性, 可以得到定位参数的线性方程组, 根据该线性方程组的残差的统计特性, 得到定位参数的加权最小二乘解。计算机仿真验证了此方法具有较好的定位性能, 在接收信号强度测量精度较高时, 本方法能够达到CRB界, 有较强的应用价值。

关键词: RSS定位; 加权最小二乘法; 多维标度

Novel Weighted Multidimensional Scaling Method for Received Signal Strength Based Source Location

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Abstract:

A RSS-based location method based on weighted multidimensional scaling is proposed in this paper. Based on the relation between received signal strength (RSS) and the distance from emitted source to the receiver, the distance information can be first obtained. Next, the source location can be modeled as multidimensional scaling and the multidimensional scaling matrix can be decomposed by subspace method. According to the orthogonality of signal subspace and noise subspace, linear equations for location parameter can then be obtained. By using the statistical characteristic of the errors for the linear equations, the weighted least square solution for source location can be finally found. Computer simulation shows the efficiency and practicality for this method. The method can attain the CRB at moderate SNR.

Keywords: RSS-based Location, Weighted Least Square, Multidimensional Scaling

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