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论文

MIMO与MISO雷达定位精度分析

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Study of Localization of MIMO and MISO Radars

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摘要 在某些应用中需要使小型机动接收平台(飞机或舰船)对目标进行定位，该文利用基站阵列辅助小型机动平台定位目标，可构成多输入多输出(MIMO)和多输入单输出(MISO)两种工作模式。文中建立了几何模型，并分别在这两种模式下推导了目标相对定位精度的几何稀释(GDOP)的计算公式，分析了两种模式下影响GDOP的各种因素。仿真结果证明，MIMO模式下，目标的相对定位精度与目标方位角和小型机动平台位置均无关；阵列天线数目较大或小型机动平台离目标较远时，MIMO模式的定位精度高于MISO模式；当阵列天线数目较小且小型机动平台离目标较近时，MISO模式的定位精度高于MIMO模式。

关键词： 目标定位 多输入多输出 多输入单输出 定位精度的几何稀释

Abstract： In some applications, a target needs to be located by a small-sized mobile platform, such as plane or ship. In this paper, the target is located by a small-sized mobile platform assisted by an array in the base station, which could work together under two modes: Multiple-Input Multiple-Output (MIMO) mode and Multiple-Input Single-Output (MISO) mode. The geometric model is established. Also, the Geometrical Dilution Of Precision (GDOP) of the relative coordinating errors of the target are formulated and factors affecting GDOP are analyzed under the two modes respectively. Simulation results show that: under MIMO mode, the GDOP is irrelevant neither to the azimuth of the target nor to the location of the small mobile platform; the location precision under MIMO mode is higher than that under MISO mode when the small mobile platform is far from the target or the number of array elements is large; however, lower when the small mobile platform is close to the target and the number of array elements is small.

Keywords： Target localization Multiple-Input Multiple-Output (MIMO) Multiple-Input Single-Output (MISO) Geometrical Dilution Of Precision (GDOP)

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