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2D雷达组网中目标高度估计误差的Cramér-Rao限

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On the CRLB of Height Estimation in a 2-Dimensional-Radar-Based Network

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摘要 在由2坐标雷达组成的雷达网中,推导了目标高度估计误差的CRLB(Cram啨r Rao限),并通过不同条件下的数值计算得到了一些结论。结果表明,目标高度估计误差的CRLB既与雷达的测角误差有关,也与目标和2个雷达站形成的夹角有关系,雷达配置在不同的高度上有利于目标高度估计的收敛性。这些结论对于2坐标雷达组网以及雷达网中的传感器管理具有指导意义。

关键词: 高度估计　Cramér-Rao限　最大似然估计(ML)　Fisher信息阵(FIM)　雷达组网

Abstract： In a radar network composed of two 2-dimensional radars, the CRLB of height estimation is obtained. Some conclusions are drawn based on the numerical results for various conditions. It is concluded that the CRLB of height estimation is dependent on the bearing measurement errors of the radars. It is also found that the height estimation performance is greatly dependent on the angle in the triangle composed of the target and the two 2-dimensional radars, and that distributed placement of the radars at different heights can improve the convergence performance of target height estimation. The conclusions in this paper are useful in 2-dimensional radar-netting and in sensor management.

Keywords： height estimation　Cramér-Rao low bound(CRLB)　maximum likelihood estimation(ML)　Fisher information matrix(FIM)　radar netting

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