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传感器与信号处理

# 基于ICSA-MWF的多级投影干扰抑制方法

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摘要：

为降低子空间投影方法的计算量，提出基于迭代相关相减结构多级维纳滤波器(iterative correlation subtraction algorithm-multistage Wiener filter，ICSA-MWF)的无源雷达多级投影干扰抑制方法。该方法根据回波通道内多径干扰的特点，首先提出一种新的初始化方法将ICSA-MWF应用于距离-多普勒频移域内，依据其前向投影特性即可利用多级小维数投影取代子空间投影方法,接着又提出一种简便的滤波器级数选取方法,然后利用迭代算法实现后向误差综合，最终输出误差即为多径干扰抑制后的信号。该方法干扰抑制性能好、数值稳健且计算量低于子空间投影方法。仿真结果表明该方法的有效性。

关键词： 雷达系统 信号处理 干扰抑制 子空间投影 多级维纳滤波器

# ICSA-MWF based multistage projection interference suppression method

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Abstract:

The interference suppression method based on the implemented iterative correlation subtraction algorithm--multistage Wiener filter (ICSA-MWF) is developed for reducing the high computational load of subspace projection in passive radar systems. To apply ICSA-MWF to the range Doppler domain, a new initialization is proposed due to the characteristics of interference in the echo channel. According to the property of the forward recursion, the multistage projection is substituted for the subspace projection. Then a simple filter rank selection method is introduced. The backward recursion is implemented by the iterative method, and the output error is the multipath interference suppressed echo signal. The ICSA-MWF method performs well in both interference suppression and robustness with computational simplicity. The simulation results demonstrate the effectiveness of the ICSA-MWF based method.

Keywords: radar system signal processing interference suppression subspace projection multistage Wiener filter

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