

“Coherent adaptive detection in MIMO radars”, pp. 23-31

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Abstract – The superiority of Multiple-Input Multiple-Output (MIMO) radars over the conventional phased array radars has been recently shown in many aspects. The MIMO radars have better detection performance and can extract target information more precisely than phased array radars. In this paper, for the first time, the problem of adaptive target detection using temporal coherent pulse terrain in presence of colored interference is considered for MIMO radars. We have introduced a structure that is suited for coherent detection. Based on this structure, we have formulated the problem as a hypothesis test. For interference with unknown statistics three adaptive decision rules have been developed using the generalized likelihood ratio test (GLRT). The performance of the proposed detectors have been evaluated using Monte-Carlo simulations. The results show the superiority of the MIMO radars with temporal coherent processing over the conventional phased arrays in presence of colored interference. This superiority is shown to be due to both angular spread and a newly presented phenomenon which is called Doppler spread in this paper.