

Weighted Thinned Planar Arrays by Almost Difference Sets and Convex Programming

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Abstract

The design of thinned arrays can be carried out with several techniques, including optimization approaches (GA, SA, PSO) as well as analytical methods. In this framework, uniformly weighted synthesis are usually considered in order to simplify the synthesis problem (due to the reduced number of degrees of freedom). However, hybrid techniques aimed at selecting both the thinning scheme as well as the optimal tapering are currently investigated due to the higher achievable performances. Recently, the exploitation of Convex Programming has been proposed as a powerful tool to design optimal weighting sequences with arbitrary patterns. Accordingly, joining a sub-optimal thinning scheme, such as Almost Difference Sets (ADS), with such an approach could yield optimal pattern control performances as well as simple architectures in terms of feeding network complexity and overall weight. As a consequences, the objective of the activity will be that of analyzing the performances of a hybrid Convex Programming-ADS methodology when dealing with planar arrays.

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*This report is submitted in partial fulfillment of the degree of the course "ACM".
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