

Synthesis Of Polarization Agile Interleaved Arrays Based On Linear And Planar ADS And DS.

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Abstract

The design of large arrays for radar applications require the use of appropriate techniques to group antennas (subarraying) in order to generate different radiation pattern with suitable properties. In particular, it is of great interest to synthesize the desired polarization pattern in order to allow an improved signal to noise ratio in reception. In this context, the techniques are divided into "overlapping" techniques, in which some of the elements used for the different patterns coincide, and "interleaving", in which the elements for the various patterns are distinct. The latter technique is particularly favorable in terms of complexity and cost of the feeding network, as each element can be powered by a single feeding line. The design of Interleaved Arrays can be traced in part to those of the thinned Arrays. Consequently, the use of Difference Sets and Almost Difference Sets, currently used for the design of thinned arrays with excellent properties of radiation, may be extended to Interleaved Arrays. In particular, some properties can be exploited directly resulting from the definition of DS and ADS, such as the fact that if a binary sequence is derived from an ADS, then also its complement has the same properties of radiation. The purpose of this activity is to investigate the applicability of DS and ADS design of Interleaved Arrays of large size with high performance in terms of Peak Sidelobe Level and agility of polarization. Towards this end, Genetic algorithms will be employed in conjunction with ADS codebooks, and several different objectives will be considered.

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