

Generator optimization for thinned fractal hexagonal and pentagonal antenna arrays using Ant Colony algorithm

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Abstract:

Unique properties of fractals are utilized in a new class of antenna-element designs, called fractal antenna arrays that are multi-band and compact in size. This paper investigates the use of Ant Colony Optimization (ACO) algorithm for thinning fractal antenna arrays by estimating the optimum combination of 'on' and 'off' elements corresponding to lowest possible Side Lobe Level (SLL). The ACO method is employed to determine the suitable excitation amplitude for each element of the subarray generator, allowing maximum SLL reduction. In order to demonstrate the effectiveness of the proposed method, hexagonal and pentagonal arrays with 6-element concentric circular ring subarray generator are investigated with and without the ACO method. The ACO results are compared with those obtained for the arrays in which all the elements are turned 'on', and the results show the superior performance of the proposed method. © 2017 IEEE.

Reference:

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