In this paper the maximum sidelobe level (SLL) reductions without and with central element feeding in various designs of three-ring concentric circular antenna arrays (CCAA) are examined using Particle Swarm Optimization with Constriction Factor Approach (PSOCFA) to finally determine the global optimal CCAA design. Binary coded Genetic Algorithm (BGA) is also employed for comparative optimization but it proves to be suboptimal. The present paper assumes non-uniform excitations and uniform spacing of excitation elements in each three-ring CCAA design. Among the various CCAA designs, the three-ring CCAA containing central element and 4, 6 and 8 elements in three successive concentric rings proves to be such global optimal design with global minimum SLL (-17.42dB) determined by PSOCFA.

Reference


Index Terms

Electronics
Performance and Reliability

Key words
Concentric Circular Antenna Array
Non-uniform Excitation
Sidelobe Level
Binary Coded Genetic Algorithm
Particle swarm optimization with constriction factor approach