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OPTIMAL RADIATION PATTERN DESIGN OF ADAPTIVE LINEAR ARRAY ANTENNA BY PHASE AND AMPLITUDE PERTURBATIONS USING MEMETIC ALGORITHMS

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Abstract. *A novel method based on the memetic algorithm for the optimal radiation pattern of a linear array antenna by phase-amplitude perturbations is proposed. An optimal radiation pattern design for an adaptive antenna is not only adjustably to suppress interference in the interfering direction but also adjustably to derive the maximum power radiation pattern in the desired signal's direction. The memetic algorithm is applied to find the optimal radiation pattern of the proposed adaptive antenna by using a two-way convergent method. The Memetic algorithm combines the advantages of efficient heuristics incorporating domain knowledge and population-based search approaches for optimization problems. In this study, we show the usefulness of a memetic algorithm for global search and flexibly reasonable stopping criteria. This skill is also able to do the cancelation of multiple interferences for different incident directions. Two examples are provided to justify the proposed phase-amplitude perturbations approach based on memetic algorithms. Computer simulation results are given to demonstrate the effectiveness of the proposed method.*

Keywords: Adaptive linear array antenna, Phase and amplitude perturbations, Memetic algorithm

1. **Introduction.** Radiation pattern optimization techniques are very important to suppress undesired interferences and enhance desired signals. Adaptive beamforming techniques are used to obtain the desired antenna radiation pattern by adjusting the antenna parameters such as phase and amplitude weights of the antenna array. The beamforming skills of adaptive antenna include phase-only perturbations, phase-position perturbations and phase-amplitude perturbations. This paper focuses on the memetic algorithm for optimal radiation pattern of a linear array antenna by phase-amplitude perturbations.