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Optimal pattern radiation design of linear adaptive array antenna using Amplitude-Phase Perturbations based on particle swarm optimization

Hsu, Chao-Hsing; Chen, Chun-Hsiang; Shyr, Wen-Jye; Kuo, Kun-Huang; Lin, Tsung-Chih; Chung, Yi-Nung

Abstract

In this paper, an innovative optimization method based on the particle swarm optimization (PSO) algorithm is proposed for optimal radiation pattern of linear adaptive array antenna using Amplitude-Phase Perturbations. An optimal radiation pattern design for an adaptive antenna system is not only to suppress interference by placing a null in the direction of the interfering source but also to derive the maximum power pattern in the direction of the desired signal. The PSO is used to solve combinatorial optimization problems for the weighting vector of the array factor (AF), which makes the radiation pattern optimized for the proposed adaptive antenna. The PSO algorithm is a new methodology in this study field, which can handle adaptive radiation pattern of antenna array and the signal interference ratio (SIR) can be maximized.

Key words: Amplitudephase perturbations; Linear adaptive array antenna; Optimal radiation pattern; Particle swarm optimization