

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Fixed and Broadcast Communications (6)

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A NOVEL PATTERN SYNTHESIS METHOD FOR SPACE-BORNE ARRAY ANTENNAS IN
COMMUNICATION SATELLITE SYSTEMS

Abstract

Pattern synthesis to achieve an arbitrary beam shape is very important for space-borne array antennas in communication satellite system. In this paper, a pattern synthesis method with an arbitrary footprint for array elements placed in an arbitrary planar shape involved with different embedded element patterns is proposed. In this method, an objective function which is composed of items on side lobe levels, gain and shape of main lobe is built. Excitation coefficients of elements in antenna array are achieved by using a generalized Rayleigh quotient approach. A weighted iteration method is then adopted to increase the accuracy of pattern synthesis. Several synthesis examples with different array and different pattern shape are presented to illustrate the proposed method. Its performances are evaluated and compared with those of Weighted Alternating Reverse Projection method and iteration weighted LMS method, and the results show that the proposed method has better performance with higher accuracy and lower computation load.