Linear Array Geometry Synthesis with Minimum Sidelobe Level and Null Control Using Taguchi Method

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Abstract : This paper describes the synthesis of linear array geometry with minimum sidelobe level and null control using the Taguchi method. Based on the concept of the orthogonal array, Taguchi method effectively reduces the number of tests required in an optimization process. Taguchi method has been successfully applied in many fields such as mechanical, chemical engineering, power electronics, etc. Compared to other evolutionary methods such as genetic algorithms, simulated annealing and particle swarm optimization, the Taguchi method is much easier to understand and implement. It requires less computational/iteration processing to optimize the problem. Different cases are considered to illustrate the performance of this technique. Simulation results show that this method outperforms the other evolution algorithms (like GA, PSO) for smart antenna systems design.
Keywords : array factor, beamforming, null placement, optimization method, orthogonal array, Taguchi method, smart antenna system