

Pattern Synthesis of Nonuniform Linear Arrays Including Mutual Coupling Effects Based on Gaussian Process Regression and Genetic Algorithm

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Abstract : This paper proposes a synthesis method for nonuniform linear antenna arrays that combine Gaussian process regression (GPR) and genetic algorithm (GA). In this method, the GPR model can be used to calculate the array radiation pattern in the presence of mutual coupling effects, and then the GA is used to optimize the excitations and locations of the elements so as to generate the desired radiation pattern. In this paper, taking a 9-element nonuniform linear array as an example and the desired radiation pattern corresponding to a Chebyshev distribution as the optimization objective, optimize the excitations and locations of the elements. Finally, the optimization results are verified by electromagnetic simulation software CST, which shows that the method is effective.

Keywords : nonuniform linear antenna arrays, GPR, GA, mutual coupling effects, active element pattern

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