Abstracts

Automated design of corrugated feeds by the adjoint network method

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Automated full-wave design of corrugated feeds is generally accomplished by repeated numerical analysis of different feed geometries as obtained by slightly varying the geometrical dimensions of the corrugations. Since a corrugated feed contains hundreds of discontinuities, the above procedure is very time-consuming. In order to reduce the numerical effort, the adjoint network method (ANM) has been applied to the design and sensitivity analysis of circular corrugated feeds radiating into free space. By using the ANM, the return loss sensitivities with respect to variations of all geometrical dimensions are obtained with just one analysis of the entire feed. When a geometrical parameter is varied, only the discontinuity containing that parameter needs to be analyzed; the overall sensitivities being computed by means of a simple formula. Corrugated feeds with more than 100 corrugations have been designed by using the ANM. They have been built and measured demonstrating the efficiency of the proposed approach.

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