Abstracts

Computer-Aided Design of Beam Forming Networks for Modern Satellite Antennas

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Multicontoured and reconfigurable beam spacecraft antennas rely on sophisticated beam forming networks (BFN). Accurate and efficient CAD tools are required to meet the stringent requirements on the power (division, while avoiding any tuning or trimming of the BFN. This paper presents advanced field theoretical techniques for the analysis and optimization of microwave beam forming networks realized in both waveguide and square coaxial cable technologies. Such advances consist in new segmentation techniques of the microwave components associated with efficient mode-matching formulations for the modeling of isolated as well as coupled discontinuities. The achieved numerical efficiency, allows sophisticated synthesis procedures, based on repeated full-wave analysis in wide frequency bands, to be performed on small machines such as a 386 PC. The design tools developed have been widely validated through a comprehensive test campaign.

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