Abstracts

A novel design approach for microwave planar filters

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This paper presents an efficient design approach for large planar filter circuits using very accurate full-electromagnetic simulations. This new hybrid optimisation technique combines the accurate - but expensive - full electromagnetic simulation with the inexpensive - but less accurate - cascaded circuit analysis. By altering the coupling matrix of the cascaded circuit simulation we attain the computational speed of the cascaded simulation, but the accuracy of the full-electromagnetic simulation. To reduce computational costs further, we introduce the multi-dimensional Cauchy method to the cascaded circuit simulation. The proposed techniques result in a considerable gain in design reliability and a significant reduction of computational cost when compared to conventional methods. The new method is demonstrated by the optimisation of a superconductive planar narrow-band 6-Pole filter for space applications. Using our optimisation scheme the computational costs can be cut to about 1.5% compared to a full-EM based optimisation.

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