Abstracts

Edge-conditioned vector basis functions for the analysis and optimization of rectangular waveguide dual-mode filters

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The reliable computer-aided design of narrowband dual-mode filters is usually hampered by extensive CPU-time and memory requirements of commercially available software packages. This paper introduces a new concept within the coupled-integral-equations-technique (CIET) which takes into account all edge conditions simultaneously and, therefore, permits the analysis and optimization of such filter components in a timely fashion. A 12.3 GHz four-pole dual-mode filter in rectangular waveguide is chosen as design example. Comparison with HP's HFSS shows good agreement, whereas the mode-matching technique (MMT) did not converge with up to 600 modes. The CIET routine converges with up to 23 edge-conditioned vector basis functions and up to 1750 modal summation terms. Due to its speed, the new approach can also be used for a Monte-Carlo-based tolerance analysis which shows a manufacturing accuracy of 0.02 mm for this critical dual-mode filter example.

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