# Abstracts

## Automated design of waveguide components using hybrid mode-matching/numerical EM building-blocks in optimization-oriented CAD frameworks-state of the art and recent advances

*F. Arndt, R. Beyer, J.M. Reiter, T. Sieverding and T. Wolf. "Automated design of waveguide components using hybrid mode-matching/numerical EM building-blocks in optimization-oriented CAD frameworks-state of the art and recent advances." 1997 Transactions on Microwave Theory and Techniques 45.5 (May 1997, Part II [T-MTT]): 747-760.*

Fast hybrid mode-matching/boundary-contour (MM/BC) and mode-matching/finite-element (MM/FE) waveguide building blocks are described for the optimization-oriented use in powerful circuit computer-aided design (CAD) tools and the automated design of waveguide components. The efficient electromagnetic (EM) CAD technique allows the accurate design of a comprehensive class of rectangular and circular waveguide components including realistic structures of higher complexity. The efficiency and flexibility of the hybrid CAD method is demonstrated at advanced EM design examples, such as broad-band circular-to-rectangular waveguide transitions including octagonal cross sections, waveguide resonator filters with rounded corners, optimum-shaped bends, dual-mode filters with coupling sections without tuning screws, ridged waveguide filters with rounded corners, and multiplexers. The designed components are directly amenable to cost-efficient fabrication techniques like computer-controlled milling methods. The theory is verified by available measurements.

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