Abstracts

A stable and efficient admittance method via adjacence graphs and recursive thresholding

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The generalized admittance method is a rigorous full-wave approach for the analysis of waveguide circuits. Unfortunately, it may present the risk of ill conditioning, especially when very complex structures are analyzed with a considerably high number of modes. In this paper, the concepts of adjacence graph and recursive thresholding are proposed to solve its numerical problems. By applying the proposed strategy, the linear system representing the core of the analysis is partitioned into many independent and well-conditioned subsystems, thus improving the numerical stability of the approach and its efficiency. The attractive features of the proposed approach are its simplicity and immediate implementation. Results are given, referred to a real industrial case, a complex E/H-plane filter, whose analysis could not be performed via a standard admittance method when a very high number of modes were considered. With the present approach, the ill conditioning is avoided and considerable enhancements in computing times is achieved.

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