Abstracts

An optimized parallel admittance matrix approach using the adjacence-graph recursive-thresholding technique

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The admittance method is an accurate approach for the analysis of electromagnetic circuits. Unfortunately, until now it has suffered from two main limitations, i.e., its high numerical complexity and its lack of robustness, due to the risk of numerical ill conditioning in a linear system representing the core of the approach. In a previous paper, both drawbacks have been solved, using a strategy based on the system partitioning into many independent and well-conditioned reduced-size subsystems, thanks to the exploitation of the matrix adjacence graph properties. In this paper, we demonstrate that the use of this strategy paves the way to a natural, straightforward, and low-cost migration on distributed platforms, with a consequent substantial reduction in computer times. Furthermore, the use of suitable optimization strategies proposed here allows an optimum partitioning of the system in order to maximize the parallel efficiency.

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