Abstracts

Simultaneous Time and Frequency Domain Solutions of EM Problems Using Finite Element and CFH Techniques

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This paper describes an efficient method for both time- and frequency-domain solutions of electromagnetic (EM) field problems. In this method EM field problems are formulated using Laplace-domain finite element approach and are solved using complex frequency hopping (CFH) technique. CFH is a moment-matching technique which has been used successfully in the circuit simulation area for solution of large set of ordinary differential equations. Problems consisting of Dirichlet, Neumann and combined boundary conditions can be solved using the proposed algorithm to obtain both time and frequency responses. Several electromagnetic field problems have been studied using the new technique and the speed-up advantage (one to three orders of magnitude) compared to conventional finite element technique is demonstrated. A good agreement between numerical results obtained using the proposed method and the previously published results has been found.

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