



Scattering Analysis of Periodic Structures Using Finite-Difference Time-Domain Method

By Fan Yang

Morgan & Claypool. Paperback. Book Condition: New. Paperback. 140 pages. Dimensions: 9.2in. x 7.5in. x 0.3in. Periodic structures are of great importance in electromagnetics due to their wide range of applications such as frequency selective surfaces (FSS), electromagnetic band gap (EBG) structures, periodic absorbers, meta-materials, and many others. The aim of this book is to develop efficient computational algorithms to analyze the scattering properties of various electromagnetic periodic structures using the finite-difference time-domain periodic boundary condition (FDTD-PBC) method. A new FDTD-PBC-based algorithm is introduced to analyze general skewed grid periodic structures while another algorithm is developed to analyze dispersive periodic structures. Moreover, the proposed algorithms are successfully integrated with the generalized scattering matrix (GSM) technique, identified as the hybrid FDTD-GSM algorithm, to efficiently analyze multilayer periodic structures. All the developed algorithms are easy to implement and are efficient in both computational time and memory usage. These algorithms are validated through several numerical test cases. The computational methods presented in this book will help scientists and engineers to investigate and design novel periodic structures and to explore other research frontiers in electromagnetics. Table of Contents: Introduction FDTD Method and Periodic Boundary Conditions Skewed Grid Periodic Structures Dispersive Periodic Structures Multilayered Periodic Structures...



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