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# Electromagnetic Fields in Cavities: Deterministic and Statistical Theories

*David A. Hill*

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The topic of this book is the analysis of electromagnetic fields in cavities of general shapes and properties. The book is divided into two parts. **Part 1** covers classical deterministic methods to determine resonant frequencies, modal fields, cavity losses and quality factor (Q), mode bandwidth, and the excitation of cavity fields from arbitrary current distributions for metal-wall cavities of simple shape. Part 1 is more complete than other publications (book chapters or journals) because it includes all modes, rather than just the dominant mode. Also, it includes wall losses and a special treatment of the current source region so that the problem of infinities at resonant frequencies and source regions does not occur.

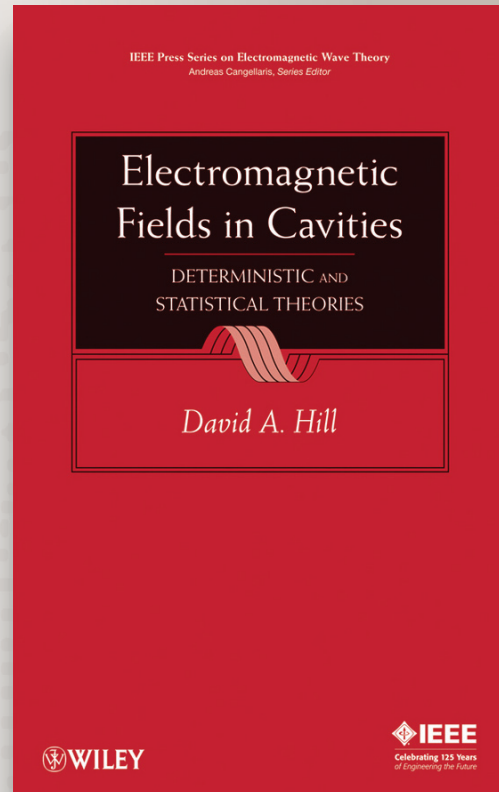
**Part 2** covers modern statistical methods to analyze electrically large cavities of complex shapes and properties. This is a rapidly developing area that is difficult to grasp for the non-expert because new papers are frequently appearing in a variety of technical journals. This book combines rigorous solutions to Maxwell's equations with conservation of energy to solve for the statistics of many quantities of interest: penetration into cavities (and shielding effectiveness), field strengths far from and close to cavity walls, and power received by antennas within cavities. No other books have these features; no other books cover reverberation chambers, an electromagnetic compatibility (EMC) test facility of increasing popularity. The utility of the book to the reader is to have fairly simple statistical formulas to apply to his particular problem of interest (interference calculations, electromagnetic compatibility testing in reverberation chambers (also called mode-stirred chambers), measurement of shielding materials using multiple cavities, efficiency of test antennas, etc.

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