Chapter 3

Techniques for Low-Frequency Problems

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Andrew J. Poggio was born in New York City in 1941. He received a PhD in electrical engineering from the University of Illinois in 1969. His doctoral research was directed toward the numerical solution of integral equations for dipole and slot antennas. As a research associate at MB Associates he performed research in numerical techniques and mathematical modeling in electromagnetic wave theory and was instrumental in developing computer methods for solving boundary value problems associated with electromagnetic scatterers and antennas. At the Cornell Aeronautical Laboratory he was a research engineer studying the propagation of electromagnetic waves in random media. Now a staff member of the Lawrence Livermore National Laboratory, he is at present involved in microwave and millimeter-wave analytical and experimental programs and leads the Electromagnetic Diagnostic Systems Group and the Microwave Engineering Facility.

Edmund K. Miller was born in Milwaukee in 1935. He received a PhD in electrical engineering from the University of Michigan in 1965. At the Radiation Laboratory, and later at the High Altitude Research Laboratory, of the University of Michigan, he conducted experimental and analytical research in plasma–electromagnetic-wave interaction. In 1968 he joined MB Associates, where he worked on integral-equation methods for modeling antennas in both the time and frequency domains. His involvement in numerical techniques continued at the Lawrence Livermore National Laboratory, which he joined in 1971 and where he served as leader of the Engineering Research Division and the Nuclear Energy Systems Division until 1985. He was Regent’s Distinguished Professor of Electrical and Computer Engineering at the University of Kansas at Lawrence from 1985 to 1987 and is now Manager of Electromagnetics at Rockwell International Science Center. He has lectured widely on computer methods in electromagnetics and has taught numerous short courses on the subject. Dr. Miller has published more than 60 articles on numerical methods, their electromagnetic applications, signal processing, graphics, and related topics.