

## Contents: Volume 2

<b>6. ANTENNAS AND INTEGRAL EQUATIONS</b>	<b>411</b>
<b>Wire Antennas</b>	<b>411</b>
6.1. Introduction	411
6.2. The perfectly conducting wire	411
6.3. General excitation of the infinite wire	416
6.4. The finite travelling-wave antenna	425
6.5. The finite wire	427
6.6. The receiving antenna	431
6.7. Numerical methods	438
6.8. Curved antennas	447
6.9. Log-periodic antennas	454
6.10. Loads and arrays	458
 <b>Solid Antennas</b>	<b>459</b>
6.11. Wire grid models	459
6.12. The electric-field integral equation	463
6.13. Uniqueness	474
6.14. The magnetic-field integral equation	477
6.15. The Fredholm alternative	481
6.16. Compactness and other properties of the MFIE	489
6.17. Other integral equations	493
6.18. Numerical considerations for surfaces	503
6.19. Singular integrals	506
6.20. The algebraic system	508
6.21. The null-field method	510
6.22. The impedance boundary condition	511
 <b>Dielectric Antennas</b>	<b>515</b>
6.23. The infinite dielectric circular rod	515
6.24. Modal excitation	521
6.25. The finite rod	526
6.26. Integral equations for general shapes	527
6.27. Uniqueness for dielectrics	532
6.28. Hybrid methods	535
 <b>7. TRANSIENT PHENOMENA</b>	<b>537</b>
7.1. Finite differences	537
7.2. Integral equations in the time domain	538
7.3. Numerical methods for thin wires in the time domain	544
7.4. Perfectly conducting bodies	548

7.5. Numerical matters	550
7.6. The harmonic approach versus the impulse response	555
7.7. The Laplace transform	556
7.8. The location of the poles	567
7.9. The impulse response	573
7.10. Practical determination of the positions of the poles	576
7.11. Prony's method	578
<b>8. GEOMETRIC THEORY OF DIFFRACTION</b>	<b>583</b>
8.1. The high-frequency approximation	583
8.2. Geometrical optics	588
8.3. The ray and transport equations	593
8.4. The stratified medium	601
8.5. Fermat's principle	607
<b>Numerical Solution of Ordinary Differential Equations</b>	<b>616</b>
8.6. Multistep methods	616
8.7. Runge-Kutta methods	628
8.8. Comparison of Runge-Kutta and predictor-corrector methods	632
8.9. Extrapolation	633
8.10. Systems of differential equations	634
8.11. The 'best' numerical method	635
<b>Canonical Problems</b>	<b>636</b>
8.12. Geometrical optics revisited	636
8.13. Focusing	637
8.14. Reflection by stratification	644
8.15. Edges	654
8.16. Edge rays	663
8.17. Uniformly valid-approximations	668
8.18. Double edge diffraction	678
8.19. Emission from a waveguide	694
8.20. The wedge	711
8.21. The effect of curvature	718
8.22. Generalization	737
8.23. Optimal curvature	742
8.24. The diffraction matrix for a curved boundary	743
8.25. Diffraction by a discontinuity in curvature	746
8.26. Reflector antennas	757
<b>Leaky Rays</b>	<b>763</b>
8.27. Gaussian beams and complex sources	763
8.28. Complex rays	768
8.29. Optical fibres	771

<b>9. SOURCE DETECTION</b>	783
9.1. General considerations	783
<b>Inverse Scattering</b>	786
9.2. Low frequencies	786
9.3. High frequencies	789
9.4. Scattering in the time domain	795
9.5. Moving targets	798
<b>The Inverse Source Problem</b>	801
9.6. Harmonic sources	801
9.7. Inhomogeneities	805
9.8. Statistical considerations	806
9.9. Correlation techniques	813
9.10. Far-field cross-correlation technique	816
<b>Holographic Techniques</b>	823
9.11. Basic principles of holography	823
9.12. Location of an inhomogeneity	829
9.13. Field in the aperture of an antenna	830
9.14. Zeros of entire functions	834
<b>Synthesis of Radiation Patterns</b>	837
9.15. General considerations	837
9.16. Synthesis by series expansion	839
9.17. Construction errors	842
9.18. Constrained aperture norm	844
9.19. Directivity	849
9.20. Penalty functions	851
<b>Array Signal Processing</b>	852
9.21. Adaptive beam forming	852
9.22. Simultaneous multiple beams	858
9.23. Time-varying arrays	862
REFERENCES: VOLUMES 1 AND 2	[1]
INDEX: VOLUMES 1 AND 2	[10]

## CONTENTS: VOLUME 1

1. ASPECTS OF NUMERICAL ANALYSIS	1
2. WAVEGUIDES AND DIFFERENCE EQUATIONS	98
3. OPERATORS AND EIGENVALUES	166
4. VARIATIONAL METHODS AND OPTIMIZATION	226
5. NUMERICAL ASPECTS OF VARIATIONAL METHODS	329