

Contents

Notations	XI
Transform Definitions	XII
1. Rectangular Grooves in a Plane	1
1.1 EM Scattering from a Rectangular Groove in a Conducting Plane	1
1.1.1 TE Scattering [6]	2
1.1.2 TM Scattering [7]	3
1.1.3 Appendix	4
1.2 EM Scattering from Multiple Grooves in a Conducting Plane	6
1.2.1 TE Scattering [12]	7
1.2.2 TM Scattering	8
1.2.3 Appendix	10
1.3 EM Scattering from Grooves in a Dielectric-Covered Ground Plane	11
1.3.1 TE Scattering [14]	11
1.3.2 TM Scattering	13
1.3.3 Appendix	15
1.4 EM Scattering from Rectangular Grooves in a Parallel-Plate Waveguide	17
1.4.1 TE Scattering [16]	17
1.4.2 TM Scattering [17]	19
1.5 EM Scattering from Double Grooves in Parallel Plates [18] ..	21
1.5.1 TE Scattering	21
1.5.2 TM Scattering	24
1.5.3 Appendix	26
1.6 Water Wave Scattering from Rectangular Grooves in a Plane	29
References for Chapter 1	32
2. Flanged Parallel-Plate Waveguide Array	35
2.1 EM Radiation from a Flanged Parallel-Plate Waveguide	35
2.1.1 TE Radiation [8,9]	36
2.1.2 TM Radiation [10]	36

2.2	EM Radiation from a Parallel-Plate Waveguide into a Dielectric Slab	37
2.2.1	TE Radiation	37
2.2.2	TM Radiation [17]	42
2.3	TE Scattering from a Parallel-Plate Waveguide Array [18] ...	47
2.4	EM Radiation from Obliquely-Flanged Parallel Plates	48
2.5	EM Radiation from Parallel Plates with a Window [24]	51
	References for Chapter 2	53
3.	Slits in a Plane	57
3.1	Electrostatic Potential Distribution Through a Slit in a Plane [1]	57
3.2	Electrostatic Potential Distribution due to a Potential Across a Slit [3]	59
3.3	EM Scattering from a Slit in a Conducting Plane	63
3.3.1	TE Scattering [10]	64
3.3.2	TM Scattering [11]	66
3.4	Magnetostatic Potential Distribution Through Slits in a Plane	67
3.5	EM Scattering from Slits in a Conducting Plane [13]	70
3.5.1	TE Scattering	71
3.5.2	TM Scattering	72
3.6	EM Scattering from Slits in a Parallel-Plate Waveguide	74
3.6.1	TE Scattering [26]	74
3.6.2	TM Scattering [27]	77
3.7	EM Scattering from Slits in a Rectangular Cavity	78
3.7.1	TM Scattering [29]	78
3.7.2	TE Scattering [30]	80
3.8	EM Scattering from Slits in Parallel-Conducting Planes [31] .	82
	References for Chapter 3	85
4.	Waveguides and Couplers	87
4.1	Inset Dielectric Guide	87
4.2	Groove Guide [4]	90
4.2.1	TM Propagation	91
4.2.2	TE Propagation	93
4.3	Multiple Groove Guide [8]	95
4.4	Corrugated Coaxial Line [10]	97
4.5	Coaxial Line with a Gap [13]	100
4.6	Coaxial Line with a Cavity [16]	102
4.7	Corrugated Circular Cylinder [18]	105
4.8	Parallel-Plate Double Slit Directional Coupler [23]	111
4.9	Parallel-Plate Multiple Slit Directional Coupler [29]	115
	References for Chapter 4	118

5. Junctions in Parallel-Plate/Rectangular Waveguide	121
5.1 T-Junction in a Parallel-Plate Waveguide	121
5.1.1 H-Plane T-Junction [4]	122
5.1.2 E-Plane T-Junction [5]	123
5.2 E-Plane T-Junction in a Rectangular Waveguide [6]	125
5.3 H-Plane Double Junction [8]	129
5.4 H-Plane Double Bend [9]	133
5.5 Acoustic Double Junction in a Rectangular Waveguide [11] ..	135
5.6 Acoustic Hybrid Junction in a Rectangular Waveguide [15] ..	140
5.6.1 Hard-Surface Hybrid Junction	140
5.6.2 Soft-Surface Hybrid Junction	144
5.6.3 Appendix	145
References for Chapter 5	147
6. Rectangular Apertures in a Plane	149
6.1 Static Potential Through a Rectangular Aperture in a Plane .	149
6.1.1 Electrostatic Distribution [3]	149
6.1.2 Magnetostatic Distribution	151
6.2 Acoustic Scattering from a Rectangular Aperture in a Hard Plane [7]	153
6.3 Electrostatic Potential Through Rectangular Apertures in a Plane [9]	155
6.4 Magnetostatic Potential Through Rectangular Apertures in a Plane [10]	157
6.5 EM Scattering from Rectangular Apertures in a Conducting Plane [11]	160
6.6 EM Scattering from Rectangular Apertures in a Rectangular Cavity [18]	164
References for Chapter 6	170
7. Circular Apertures in a Plane	173
7.1 Static Potential Through a Circular Aperture in a Plane	173
7.1.1 Electrostatic Distribution [1]	173
7.1.2 Magnetostatic Distribution [4]	175
7.2 Acoustic Scattering from a Circular Aperture in a Hard Plane [6]	176
7.3 EM Scattering from a Circular Aperture in a Conducting Plane	179
7.4 Acoustic Radiation from a Flanged Circular Cylinder [15] ...	185
7.5 Acoustic Scattering from Circular Apertures in a Hard Plane [17]	187
7.6 Acoustic Radiation from Circular Cylinders in a Hard Plane [19]	193
References for Chapter 7	196

8. Annular Aperture in a Plane	199
8.1 Static Potential Through an Annular Aperture in a Plane ...	199
8.1.1 Electrostatic Distribution [4,5]	199
8.1.2 Magnetostatic Distribution [4]	202
8.2 EM Radiation from a Coaxial Line into a Parallel-Plate Waveguide [6]	204
8.3 EM Radiation from a Coaxial Line into a Dielectric Slab [10]	208
8.4 EM Radiation from a Monopole into a Parallel-Plate Waveguide [17]	213
References for Chapter 8	216
9. Circumferential Apertures on a Circular Cylinder	219
9.1 EM Radiation from an Aperture on a Shorted Coaxial Line [1]	219
9.1.1 Field Analysis	219
9.1.2 Appendix	222
9.2 EM Radiation from Apertures on a Shorted Coaxial Line [3]	223
9.3 EM Radiation from Apertures on a Coaxial Line [4]	225
9.4 EM Radiation from Apertures on a Coaxial Line with a Cover [6]	228
9.5 EM Radiation from Apertures on a Circular Cylinder [10] ...	231
9.5.1 TE Radiation	232
9.5.2 TM Radiation	235
References for Chapter 9	237
A. Appendix	239
A.1 Vector Potentials and Field Representations	239
Index	243

Wave Scattering Theory

A Series Approach Based on the Fourier Transformation

Eom, H.

2001, XII, 244 p., Hardcover

ISBN: 978-3-540-41860-3