

Contents

Preface	v
Contents of Volume I	ix
8. Multilinear algebra I: tensor algebra	271
8.1 Tensor product of vector spaces	271
8.2 Uniqueness and existence	276
8.3 Properties	277
8.4 Decomposable elements	281
8.5 Tensor product of linear mappings	283
8.6 \otimes_{map} and \otimes	291
8.7 Tensor algebra	297
8.8 Permutation operators	305
8.9 Action of $GL(V)$ upon $\otimes_q^p(V)$	311
9. Multilinear algebra II: exterior algebra	315
9.1 Exterior powers of a vector space V	316
9.2 Exterior algebra	322
9.3 Bases, duality, multivector components	326
9.4 Exterior algebra and skew symmetric tensors	337
9.5 Induced mappings, determinants	343
9.6 Creation and annihilation operators; Poincaré isomorphisms	353
9.7 Subspaces and exterior algebra	366
10. Multilinear algebra III: symmetric tensor algebra	369
10.1 Symmetric powers of a vector space	371
10.2 Symmetric algebra	372
10.3 Bases, occupation numbers, duality	377
10.4 Symmetric algebra and symmetric tensors	387
10.5 Polynomials, powers, polarization	390
11. Multilinear algebra IV: metrical aspects	402
11.1 Tensor algebra: metrical aspects	402
11.2 Exterior and symmetric algebra: metrical aspects	412

11.3	Illustration A: the exterior algebra on Minkowski space M	421
11.4	Illustration B: the multilinear algebra of C_2 ; Lorentz (j, j') -spinors	426
11.5	Illustration B (continued): the spinor light cone	436
12.	Group representations III: tensor product representations	444
12.1	Tensor product of group representations	444
12.2	Intertwining maps and tensor product representations	449
12.3	Illustration B (concluded); the Wigner $3j$ -symbols	454
13.	Group representations IV: orthogonality relations, characters, group algebra	464
13.1	Orthogonality relations	464
13.2	Group characters	478
13.3	The group algebra of a finite group	492
14.	Group representations V: multiplier representations	505
14.1	Projective representations, multiplier representations, multipliers	505
14.2	The regular multiplier representations and their decompositions	514
14.3	Further properties of σ -representations	518
15.	Group representations VI: induced representations	524
15.1	Induced representations: three approaches	524
15.2	Basic properties	536
15.3	Clifford's theorem and its consequences	546
	References	563
	Index	567

Contents of Volume I

Introduction	1
1. Non-metrical linear algebra I: basic notions	6
2. Non-metrical linear algebra II: canonical forms for linear operators	67
3. Group representations I: basic notions (non-metrical)	92
4. Metrical linear algebra I: O-, Sp- and U-geometries	142
5. Metrical linear algebra II: linear operators on scalar product spaces	173
6. Metrical linear algebra III: canonical forms	201
7. Group representations II: metrical aspects	243