

CONTENTS

CHAPTER I

ASYMMETRIC CONNECTIONS

Section	Page
1. Transformation of coördinates	1
2. Coefficients of connection	3
3. Covariant differentiation with respect to the L 's..	5
4. Generalized identities of Ricci	7
5. Other fundamental tensors	8
6. Covariant differentiation with respect to the I 's..	11
7. Parallelism. Paths	12
8. A theorem on partial differential equations	14
9. Fields of parallel contravariant vectors	18
10. Parallel displacement of a contravariant vector around an infinitesimal circuit	22
11. Pseudo-orthogonal contravariant and covariant vec- tors. Parallelism of covariant vectors	27
12. Changes of connection which preserve parallelism .	29
13. Tensors independent of the choice of ψ_i	35
14. Semi-symmetric connections	36
15. Transversals of parallelism of a given vector-field and associate vector-fields	38
16. Associate directions	43
17. Determination of a tensor by an ennuple of vectors and invariants	44
18. The invariants $\gamma_{\mu}^{\nu\sigma}$ of an ennuple	47
19. Geometric properties expressed in terms of the invariants $\gamma_{\mu}^{\nu\sigma}$	50

CHAPTER II

SYMMETRIC CONNECTIONS

20. Geodesic coördinates	53
21. The curvature tensor and other fundamental tensors	55

Section	Page
22. Equations of the paths	56
23. Normal coördinates	58
24. Curvature of a curve	62
25. Extension of the theorem of Fermi to symmetric connections	64
26. Normal tensors	68
27. Extensions of a tensor	72
28. The equivalence of symmetric connections	74
29. Riemannian spaces. Flat spaces	78
30. Symmetric connections of Weyl	81
31. Homogeneous first integrals of the equations of the paths	83

CHAPTER III

PROJECTIVE GEOMETRY OF PATHS

32. Projective change of affine connection. The Weyl tensor	87
33. Affine normal coördinates under a projective change of connection	91
34. Projectively flat spaces	94
35. Coefficients of a projective connection	98
36. The equivalence of projective connections	100
37. Normal affine connection	104
38. Projective parameters of a path	106
39. Coefficients of a projective connection as tensors	107
40. Projective coördinates	110
41. Projective normal coördinates	111
42. Significance of a projective change of affine connection	116
43. Homogeneous first integrals under a projective change	117
44. Spaces for which the equations of the paths admit $n(n+1)/2$ independent homogeneous linear first integrals	119
45. Transformations of the equations of the paths	122
46. Collineations in an affinely connected space	124
47. Conditions for the existence of infinitesimal collineations	129

Section	Page
48. Continuous groups of collineations.....	133
49. Collineations in a Riemannian space.....	134

CHAPTER IV

THE GEOMETRY OF SUB-SPACES

50. Covariant pseudonormal to a hypersurface. The vector-field ν^α	137
51. Transversals of a hypersurface which are paths of the enveloping space	141
52. Tensors in a hypersurface derived from tensors in the enveloping space	143
53. Symmetric connection induced in a hypersurface ..	148
54. Fundamental derived tensors in a hypersurface ...	150
55. The generalized equations of Gauss and Codazzi..	152
56. Contravariant pseudonormal	154
57. Fundamental equations when the determinant ω is not zero	158
58. Parallelism and associate directions in a hypersurface	160
59. Curvature of a curve in a hypersurface.....	162
60. Asymptotic lines, conjugate directions and lines of curvature of a hypersurface	163
61. Projectively flat spaces for which B_{ij} is symmetric	166
62. Covariant pseudonormals to a sub-space	170
63. Derived tensors in a sub-space. Induced affine connection	171
64. Fundamental derived tensors in a sub-space.....	172
65. Generalized equations of Gauss and Codazzi.....	175
66. Parallelism in a sub-space. Curvature of a curve in a sub-space.....	177
67. Projective change of induced connection	178
BIBLIOGRAPHY.....	181