

CONTENTS

INTRODUCTION

page I

PART I: THE UNCONNECTED MANIFOLD

<i>Chap.</i> I	Invariance; Vectors and Tensors	4
II	Integrals. Densities. Derivatives Integrals; Densities, p. 14. Derivatives, p. 21.	14

PART II: AFFINELY CONNECTED MANIFOLD

III	Invariant Derivatives	27
IV	Some Relations between Ordinary and Invariant Derivatives	34
V	The Notion of Parallel Transfer	39
VI	The Curvature Tensor The question of integrability, p. 43. The curvature tensor, p. 47.	43
VII	The Geodesics of an Affine Connexion	53
VIII	The General Geometrical Hypothesis about Gravitation The underlying idea, p. 56. The law of gravitation, p. 59.	56

PART III: METRICALLY CONNECTED MANIFOLD

IX	Metrical Affinities General investigation, p. 63. Some important facts and relations, p. 69. Geodesic coordinates, p. 72.	63
X	The Meaning of the Metric According to the Special Theory of Relativity	74

Chap. XI Conservation Laws and Variational Principles 87

The elementary notion of conservation laws, p. 87. How conservation laws follow from a variational principle in classical (pre-relativistic) theories, p. 91. Conservation laws in general relativity, p. 93. Einstein's variational principle, p. 97. Non-invariant form of the conservation laws, p. 99.

XII Generalizations of Einstein's Theory *page* 106

An alternative derivation of Einstein's field equations, p. 106. The Einstein-Straus-theory, p. 108. The purely affine theory, p. 112. Discussion of the preceding theories, p. 115. Mathematical appendix to Chapter XII, p. 116.