

CONTENTS

Acknowledgement		i
Abstract		ii
Abstrak		iii
Introduction		iv
Chapter 1	Riemannian manifolds	
1.1	Introduction	1
1.2	Submanifolds	5
1.3	Tensors	6
1.4	Affine connections on manifolds	9
1.5	Riemannian manifolds	12
1.6	Distributions on a manifold	13
1.7	Vector bundles	14
Chapter 2	Tangent bundles	
2.1	Tangent bundles	16
2.2	Vertical lifts of functions	18
2.3	Vertical lifts of vector fields	20
2.4	Vertical lifts of 1-forms	21
2.5	Vertical lifts of tensor fields	22
2.6	Complete lifts of functions and vector fields	26
2.7	Complete lifts of 1-forms	31
2.8	Complete lifts of tensor fields	33
2.9	Lifts of derivations	44
2.10	Lifts of Lie derivatives	50
2.11	Lifts of covariant differentiations	50
2.12	The Lifts of a derivation determined by a tensor field of type $(1, 1)$	52
2.13	Complete lifts of tensor fields of type $(1, 1)$	55
2.14	Complete lifts of tensor fields of type $(0, 2)$	57
2.15	Complete lifts of affine connections	58
2.16	Horizontal lifts of vector fields	65
2.17	Horizontal lifts of 1-forms	72
2.18	Horizontal lifts of tensor fields	75

Chapter 3	Nullity distribution on (TM, g^C, ∇^C)	
3.1	Nullity distributions	89
3.2	Characterization of nullity distributions	93
3.3	Nullity distribution on (TM, g^C, ∇^C)	94
3.4	The dimension of the nullity distribution on (TM, g^C, ∇^C)	98
Chapter 4	(TM, \tilde{g}_t) and geodesics in (TM, \tilde{g}_t)	
4.1	Sasaki metric	103
4.2	Adapted frames	105
4.3	Geodesics in (TM, \tilde{g}_t)	111
4.4	Geodesics on a fibre	118
4.5	Natural lifts and horizontal lifts	118
4.6	Tangent vector fields of the liftings of geodesics	121
References		124