

Contents

1. The Osserman Conditions in Semi-Riemannian Geometry	1
1.1 The Jacobi Operator	1
1.2 The Timelike and Spacelike Osserman Conditions at a Point .	3
1.3 Semi-Riemannian Pointwise and Global Osserman Manifolds .	9
2. The Osserman Conjecture in Riemannian Geometry	21
2.1 Partial Solution to the Osserman Conjecture	22
2.1.1 Odd-Dimensional Riemannian Pointwise Osserman Manifolds	22
2.1.2 $(4m + 2)$ -Dimensional Riemannian Pointwise Osserman Manifolds	23
2.1.3 Four-Dimensional Riemannian Osserman Manifolds ...	29
2.2 A Solution to the Osserman Conjecture with Additional Assumptions	31
2.2.1 Kähler and Quaternionic Kähler Manifolds	31
2.2.2 Riemannian Osserman Manifolds with Two Distinct Eigenvalues	34
2.2.3 Homogeneous Manifolds of Negative Sectional Curvature	35
3. Lorentzian Osserman Manifolds	39
3.1 The Complete Solution to the Osserman Problem	39
3.2 The Null Osserman Condition	44
3.2.1 The Null Osserman Condition at a Point	46
3.2.2 Decomposition Theorems	53
4. Four-Dimensional Semi-Riemannian Osserman Manifolds with Metric Tensors of Signature $(2, 2)$	63
4.1 Nonsymmetric Semi-Riemannian Osserman Manifolds with Metric Tensors of Signature $(2, 2)$	64
4.2 Semi-Riemannian Osserman and Jordan-Osserman Manifolds with Metric Tensors of Signature $(2, 2)$	70
4.2.1 Osserman Algebraic Curvature Tensors on Four-Dimensional Vector Spaces of Neutral Signature	70

4.2.2	Four-Dimensional Semi-Riemannian Pointwise Osserman Manifolds	79
4.2.3	Symmetric Semi-Riemannian Osserman Manifolds with Metric Tensors of Signature $(2, 2)$	84
4.2.4	Classification of Semi-Riemannian Jordan-Osserman Manifolds with Metric Tensors of Signature $(2, 2)$	90
5.	Semi-Riemannian Osserman Manifolds	95
5.1	Nonsymmetric Semi-Riemannian Osserman Manifolds of Arbitrary Signature	95
5.1.1	Indefinite Kähler Osserman Manifolds	96
5.1.2	Semi-Riemannian Osserman Metric Tensors on Tangent Bundles	99
5.2	Special Semi-Riemannian Osserman Manifolds	102
5.3	Classification of Semi-Riemannian Special Osserman Manifolds	104
5.3.1	Multiplicities of the Eigenvalues	113
5.3.2	Semi-Riemannian Special Osserman Manifolds of Dimensions Different from 16 and 32	119
5.3.3	Semi-Riemannian Special Osserman Manifolds of Dimensions 16 and 32	129
6.	Generalizations and Osserman-Related Conditions	137
6.1	Semi-Riemannian Generalized Osserman Manifolds	137
6.2	The Osserman Condition in Affine Differential Geometry	143
6.2.1	Affine Osserman Manifolds	143
6.2.2	Semi-Riemannian Osserman Metric Tensors on Cotangent Bundles	146
6.3	Riemannian Manifolds with Isoparametric Geodesic Spheres ..	150
6.4	Riemannian \mathcal{C} -manifolds	151
6.5	Skew-Symmetric Curvature Operators	152
6.5.1	Riemannian Manifolds whose Skew-Symmetric Curvature Operators Have Constant Eigenvalues along each Circle	155
	References	157
	Index	165

Osserman Manifolds in Semi-Riemannian Geometry

Garcia-Rio, E.; Kupeli, D.N.; Vazquez-Lorenzo, R.

2002, XIV, 170 p., Softcover

ISBN: 978-3-540-43144-2