

About a new type of null Osserman condition on Lorentz \mathcal{S} -manifolds

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The Osserman conjecture, introduced in [3] for Riemannian manifolds, relates the properties of the Riemannian curvature to the spectral behaviour of the Jacobi operator. The Ossermann problem has been partially solved in the Riemannian case and, while it still remains open in the semi-Riemannian context, a complete solution has been reached in the Lorentzian case. As a consequence, in [1] the authors defined a different type of Osserman conditions: the *null Osserman conditions* with respect to a unit timelike vector tangent to a Lorentz manifold (see also [2]).

It is natural to study the null Osserman conditions in a Lorentz almost contact manifold and, more generally, in a Lorentz *g.f.f*-manifold, where one finds that none of the above types of Osserman conditions can be satisfied.

This motivated us to introduce another kind of null Osserman condition, adapted to the case of Lorentz *g.f.f*-structures, that we called *φ -null Ossermann condition*, which the present talk deals with. We study the links between the φ -null Osserman condition and the behaviour of the φ -sectional curvature, with a particular attention towards the relationships between the constancy of the φ -sectional curvature and the φ -null Osserman condition in a Lorentz \mathcal{S} -manifold. We state an algebraic characterization of φ -null Osserman Lorentz \mathcal{S} -manifolds with two characteristic vector fields, finally giving some examples of such manifolds.

References

- [1] E. García-Río, D.N. Kupeli and R. Vázquez-Abal, On a problem of Osserman in Lorentzian geometry, *Differential Geom. Appl.* **7** (1997), 85–100.
- [2] E. García-Río, D.N. Kupeli and R. Vázquez-Lorenzo, OSSERMAN MANIFOLDS IN SEMI-RIEMANNIAN GEOMETRY, *Lecture Notes in Mathematics*, 1777, Springer, Berlin, 2002.
- [3] R. Osserman, Curvature in the eighties, *Amer. Math. Monthly* **97** (1990), 731-756.