

Diffusion in almost-Riemannian geometry

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Abstract. In this talk I will review certain analytical and geometrical results in 2D-almost-Riemannian geometry. Two-dimensional almost-Riemannian structures are generalized Riemannian structures on surfaces for which a local orthonormal frame is given by a Lie bracket generating pair of vector fields that can become collinear. On the singular set (i.e. where these vector fields become collinear) all Riemannian quantities explodes, but geodesics are still well defined and smooth. Generically the singular set is a smooth curve. In this talk I will review certain geometric properties (normal forms, Gauss-Bonnet theorem) and I will discuss the problem of the Schrödinger and of the heat equation. In particular I will discuss if the singular set acts or not as a barrier for the heat evolution. Some open problems will be also presented.