

Geometric regularization on Riemannian and Lorentzian manifolds

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We investigate regularizations of distributional sections of vector bundles by means of nets of smooth sections that preserve the main regularity properties of the original distributions (singular support, wavefront set, Sobolev regularity). The underlying regularization mechanism is based on functional calculus of elliptic operators with finite speed of propagation with respect to a complete Riemannian metric. As an application we consider the interplay between the wave equation on a Lorentzian manifold and corresponding Riemannian regularizations, and under additional regularity assumptions we derive bounds on the rate of convergence of their commutator. We also show that the restriction to underlying space-like foliations behaves well with respect to these regularizations.

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