Metrics and connections critical for the total mixed scalar curvature of a distribution

Tomasz Zawadzki

Abstract

The mixed scalar curvature of a distribution on a Riemannian manifold is the sum of sectional curvatures of pairwise orthogonal planes that intersect the distribution along a line. In this joint work with V. Rovenski we consider the total mixed scalar curvature of a fixed distribution on Riemannian and metric-affine manifolds, as a functional depending on a pseudo-Riemannian metric [1] or on a linear connection – analogously to the Einstein-Hilbert action. In each case, the Euler-Lagrange equations are formulated and some of their solutions are obtained.

In particular, metrics critical for the total mixed scalar curvature were found for codimension-one foliations, K-contact and 3-Sasakian manifolds. On the other hand, the existence of a critical linear connection depends on the geometric properties of the distribution with respect to the Levi-Civita connection.

References

[1] V. Rovenski and T. Zawadzki, Variations of the total mixed scalar curvature of a distribution, preprint, ArXiv:1609.09409.