Problems of Extrinsic Geometry of Foliations

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Extrinsic geometry deals with properties of submanifolds, which depend on the 2nd fundamental form. Riemann tensor (2nd derivative of metric) of foliations belongs to the intrinsic geometry, but its part called the mixed curvature (1st derivative of metric) belongs to the extrinsic geometry.

Our lectures are devoted to topics and related problems of the extrinsic geometry of Riemannian manifolds equipped with distributions or foliations, see [1-4].

• Mixed scalar curvature of almost product manifolds in integral formulas, splitting theorems, Dupin hypersurfaces, Einstein-Hilbert type action.

• Weak metric structures on manifolds (generalizing the almost contact metric structure, and K. Yano's f-structure), their interaction with Ricci-type solitons and applications to non-symmetric Einstein geometry.

• Willmore-type functionals, curvature invariants alternative to Chen δ-invariants, geometrical inequalities, ideal immersions of foliated manifolds.

References

[1] Rovenski V. and Walczak P., *Extrinsic Geometry of Foliations*, Birkhäuser, Progress in Mathematics vol. 339, 2021, 319 pp.

[2] Rovenski V., *Geometric Inequalities for a Submanifold Equipped with Distributions*, Mathematics **10** (2022) 4741.

[3] Rovenski V., *Geometry of Weak Metric f-Manifolds: A Survey*, Mathematics **13** (2025) 556.

[4] Zlatanović M. and Rovenski V., *Applications of Weak Metric Structures to Non-Symmetrical Gravitational Theory*, Filomat **40** (2026) 1253-1269.