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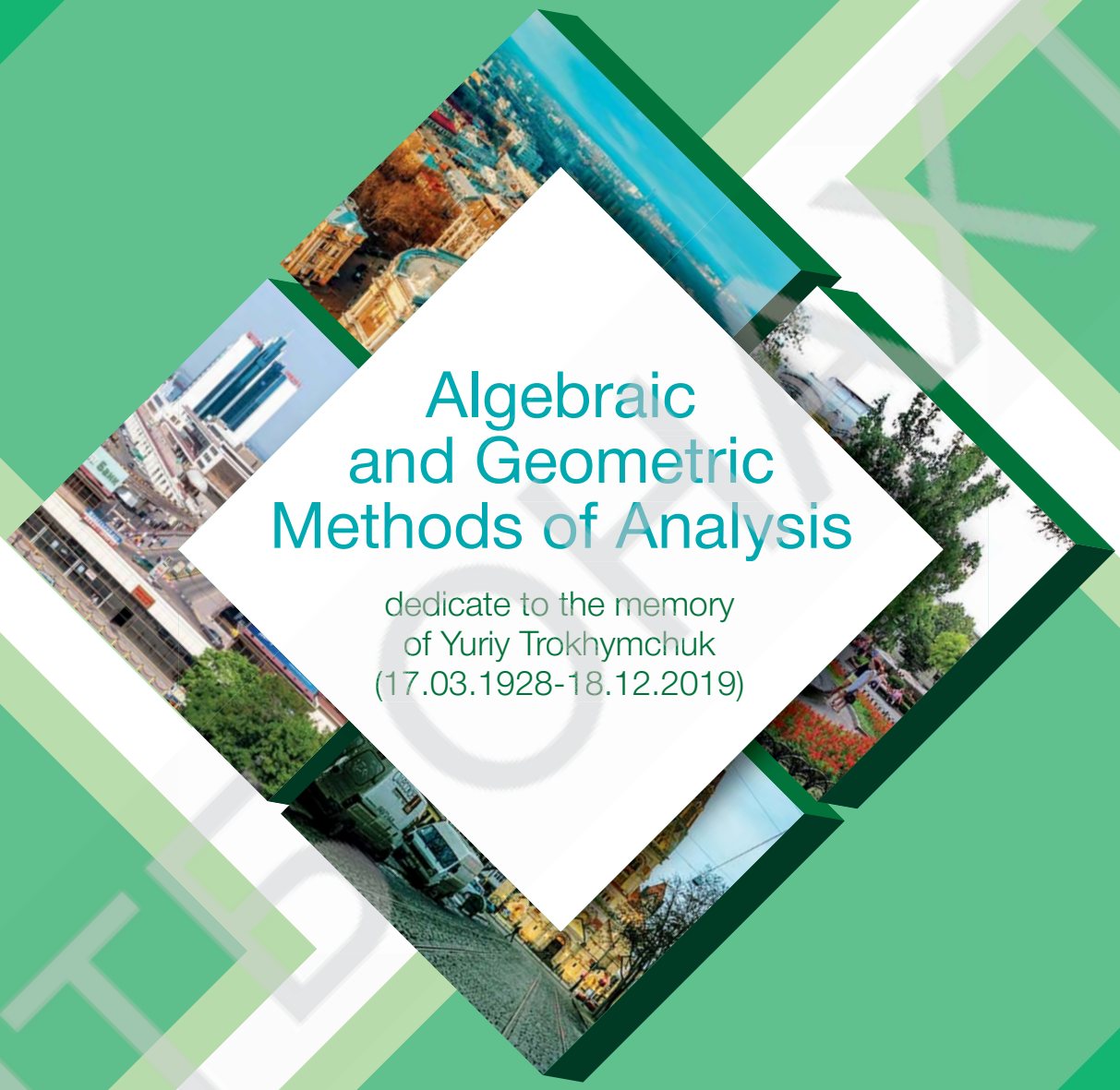

Algebraic and Geometric Methods of Analysis

dedicate to the memory
of Yuriy Trokhymchuk
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List of topics

- Topological methods in analysis
- Geometric problems of complex and mathematical analysis
- Algebraic methods in geometry
- Differential geometry in the whole
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Geometric and topological methods in natural sciences

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Some generalizations of the known theorems of the type of geodesical unique definability

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The realized in [1] broadening to the noncompact but complete spaces of affine connection the well-known Hopf-Bochner-Uano techniques ([3], for example) on the grounding the so called vanishing theorems allowed to broad to the corresponding spaces some well-known theorems of the type of geodesical unique definability ([2], for example). In particular, it is grounded that the next theorems take place.

Theorem 1. *Complete connected noncompact Riemannian C^r-space V^n $(n > 2,\ r > 4)$ with the positive defined metric tensor and the Einstein tensor that doesn't equal to zero identically, that satisfies the recurrence conditions*

$$T^{(\alpha\beta)}_{ijkl,mh}g^{mj}g^{hl}E^{ik}_{\cdot\cdot} = T^{(\alpha\beta)}_{ijkl}W^{ijkl} + \frac{1}{n}T^{(\gamma j)}_{ijkl}R^{(\alpha|l|\beta)}_{\gamma\ \ \cdot\ \cdot}E^{ik}_{\cdot\cdot} - \frac{1}{n}T^{(\alpha j)}_{ijkl}R^{\beta l}_{\cdot\cdot}E^{ik}_{\cdot\cdot} -$$
$$-\frac{1}{n}T^{(\beta j)}_{ijkl}R^{\alpha l}_{\cdot\cdot}E^{ik}_{\cdot\cdot} + T^{(\alpha\beta)}_{ijkl,m}W^{ijklm},$$

where

$$T^{\alpha\beta}_{ijkl} = n\left(\delta^\beta_j R^\alpha_{ikl} - \delta^\beta_k R^\alpha_{lji}\right) - g_{ik}\left(\delta^\beta_j R^\alpha_{\cdot l} - R^{\alpha\ \ \beta}_{jl\ \ \cdot}\right) + g_{jl}\left(\delta^\beta_k R^\alpha_{\cdot i} - R^{\alpha\ \ \beta}_{ki\ \ \cdot}\right),$$

"," *means the corresponding covariant differentiation, doesn't admit non-trivial (different from the affine) geodesic mappings in the large.*

Theorem 2. *Complete connected noncompact Riemannian C^r-space V^n $(n > 2,\ r > 4)$ with the positive defined metric tensor and the Einstein tensor that doesn't equal to zero identically, that satisfies the recurrence conditions*

$$P^{(\alpha\beta)}_{ij,kh}g^{hi}E^{kj}_{\cdot\cdot} = P^{(\alpha\beta)}_{ij,k}W^{ijk} + P^{(\alpha\beta)}_{ij}W^{ij},$$

where

$$P^{\alpha\beta}_{ij} = \delta^\beta_i R^\alpha_{\cdot j} - \delta^\beta_j R^\alpha_{\cdot i},$$

W^{ij} and W^{ijk} are some arbitrary tensors, correspondingly of the second and the third valence, doesn't admit non-trivial (different from the affine) geodesic mappings in the large.

Examples of the corresponding spaces are given.

References

[1] Pigola S., Rigoli M., Mikes J. *Vanishing in finitness results in geometric analysis.* in *A Generalization of the Bochner Technique.*, Berlin: Birkhauser Varlag AG, 2008
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[3] Wu H.H. *The Bochner technique in differential geometry.* Harwood: Harwood Acad. Publ.,1987