International scientific conference

“Algebraic and Geometric Methods of Analysis”

Book of abstracts

May 28 - June 3, 2019

Odesa, Ukraine

Conference webpage: *imath.kiev.ua/~topology/conf/agma2019/*

List of topics

- Algebraic methods in geometry
- Differential geometry in the large
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences
- History and methodology of teaching in mathematics

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Riemann-Klein antagonism and problem of energy in general relativity

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B. Riemann and F. Klein had laid different principles at the foundation of geometry: the length principle which requires the possibility to measure the lengths of arbitrary lines no matter how they are situated, and the equality principle which is established by coincidence of figures in the space by miens of transformations belonging to a group of transformations of the space - the principal group of the geometry under consideration. According to E. Cartan, there is an antagonism between these principles owing to the absence of any homogeneity in an arbitrary curved Riemannian space.

In the work [1] was constructed the group of parallel translations DP, which realizes for a Riemannian space the equality principle and has as a subgroup the group of Riemannian translations RT which realizes the length principle. Therefore, the group DP unites the two approaches laid at the foundation of geometry by B. Riemann and F. Klein, thus overcoming the Riemann - Klein antagonism.

In the present work the group of parallel translations DP is used for determination of energy-momentum tensor of gravitational field.

References

[1] S. E. Samokhvalov, E. B. Balakireva. Group-theoretic matching of the length principle and equality principle in geometry. *Russian Mathematics (Iz. VUZ).*, 9 : 26–37, 2015.