The list of reports of the first international scientific workshop

"Geometry of Finsler spaces with the Berwald-Moore metric"

15 – 22 October 2005

Cairo, Egypt

Non-Commercial Foundation on Research Development in the field of Finsler Geometry "FINSLER PRIZE"

Lomonosov MSU, Moscow, Russia.
Asanov G. S. Full anisotropic Finsler metric function. Relativistic aspects

Skobeltsyn Nuclear Physics Institute of Moscow State University, Moscow, Russia
Bogoslovsky G. Yu. 4-momentum of a particle and mass shell equation in an entirely anisotropic space-time

The work is devoted to an investigation of a model for a flat full-anisotropic space-time which metric is generalization of Fisler Berwald-Moor metric. Action for a massive particle in the anisotropic space is determined on the basis of considerations of relativistic invariance and minimality along the straight World line. Formulae, which connect the canonic 4-impulse of a particle and its 3-velocity, were obtained with the variation principle. It was shown that the corresponding mass surface are the invariant of a group of relativistic symmetry for the full anisotropic space-time.

Chernov V. M. On connection of algebraic and metric properties of polynumbers algebras.

In the report connection between determining algebraic equations of polynumbers algebra elements (direct sums for real and complex algebras); "canonical" automorphisms of these algebras; polylinear forms (coefficients determining polynomials), deriving pseudometric structures in polynumbers algebras are analyzed. Geometrical interpretation for algebras with dimensions 2, 3, 4, 8 are considered.

Russian Institute for Electrotechnics, Moscow, Russia
Garas'ko G. I. Connection of elementary generalized-conformal transformations with generalized-analytical functions in a polynumbers space

In the work the connection between functions, providing elementary generalized-conformal transformations in the space of nondegenerate Polynumbers and generalized-analytical functions for the same polynumber variable. Except common structuring, concrete examples for Complex numbers C and Hypercomplex numbers H_4 are considered in the work. For the above Polynumbers it was shown that the connection may be established in such a way that generalized-analytical functions become analytical those as one goes to conformal transformations.

Research Institute of Applied Mathematics and Mechanics, Bauman Moscow State, Technical University, Moscow, Russia
Lebedev S. V. The generalized Finslerian metric tensors

The generalized Finslerian metric tensors are defined. These tensors can have different number of indexes depended on dimension and properties of Finsler space. Interdependence of these tensors with the Finsler spaces associated with commutative associative algebras is analyzed. Prospect to research of the tensors of this type is discussed. The generalized differential equation of Finsler geodesics is derived.

Bauman Moscow State Technical University, Department of Physics, Russia
Pavlov D. G. Appearing of anisotropic properties of Finsler spaces H_n from a viewpoint of an observer.

On an example of H_2, H_3 and H_4 geometries the appearing of anisotropy of *(n-1)*-"physical" subspaces for an observer "living" in the spaces is considered. It was shown that in all cases metric properties of the appropriate subspaces in some regions of typical values are close to Euclidian or pseudo-Euclidian those. Moreover, anisotropy of original Finsler spaces H_n appears on "frontier areas" of the visible *(n-1)*-dimensional Universe first of all.

Institute of Theoretical and Experimental Biophysics, Pushino, Russia
Pantcheliouga V., Shnol S. Influence of rapidly rotating massive body to form function of α-decay velocity: experimental research.

Academy of Civil Aviation, Department of Physics, St-Petersburg, Russia
Siparov S. V. On the formalism of physical theories

The close relation between the mathematical formalism of the theory and the observable phenomena is discussed. It is shown that the choice of the formalism is arbitrary. The algorithm for construction of a theory providing the possibility to perform the observation of the given properties is given. The possibilities of the Finsler generalization of the relativity theory are discussed.

"Transilvania" University, Brasov, Romania & University Politehnica of Bucharest, Department Mathematics I, Bucharest, Romania
Atanasiu G., Balan V. The 2-cotangent bundle with the Berwald-Moor's metric.

"Transilvania" University, Brasov, Romania
Atanasiu G. About the prolongations of a Finsler metric to the tangent bundle t^k m, k >1, of the higher order accelerations.

"Transilvania" University, Brasov, Romania
Atanasiu G., Brinzei N. The Berwald-Moor's metric in the tangent bundle of the second order.

University Politehnica of Bucharest, Department Mathematics I, Bucharest, Romania & "Transilvania" University, Brasov, Romania
Balan V., Brinzei N. Berwald-Moore type (h,v)-metric physical models.

In the framework of vector bundles endowed with (h,v)-metrics are presented several physical models for relativity. A characteristic of these models is that the vertical part is provided by the flag-Finsler Berwald-Moore (fFBM) metric, while the horizontal part is specialized to the conformal and to Synge-relativistic optics metrics. As well, the particular case of generalized Lagrange space provided by the normalized fFBM metric is examined, and the regularity of the metric is emphasized. For all these models, basic properties are described and the extended Einstein and Maxwell equations are determined.

"Transilvania" University, Brasov, Romania & University Politehnica of Bucharest, Department Mathematics I, Bucharest, Romania
Atanasiu G., Balan V. and Neagu M. The Pavlov's 4-poliforms of momenta K(p) = $\sqrt[4]{p_1 p_2 p_3 p_4}$ and its applications in the Hamilton geometry

The aim of this paper is to associate a generalized Hamilton space to a 4-pseudoscalar product defined in a Cartan-Minkovski space. The components of the 4-pseudoscalar product $G^{ijkl}(x,p)$ are given in terms of Cartan metrical fundamental d-tensor $g^{*ij}(x,p)$. In the particular case of the Pavlov function K(p) = $\sqrt[4]{p_1 p_2 p_3 p_4}$ the components of the v–covariant derivation of this generalized Hamilton space are derived.

"Transilvania" University, Brasov, Romania
Paun M. Invariant Finsler frames for Berwald-Moore metric

School of Mathematical Sciences, Peking University, P. R. China
Mo X. Invariant Berwald-Moore metrics on a Lie group

Very recently the existence of bi-invariant non-Riemannian Finsler metric on a connected compact non-simple Lie group has been given by Deng and Hou (S. Deng and Z. Hou, Invariant Finsler metrics on homogeneous manifolds, J. Phys. A: Math. Gen. 37 (2004), 8245-253). In this lecture, we will show that all bi-invariant Finsler metrics on a compact, connected Lie group are of Berwald type. Our approach is to determine all geodesics for biinvariant Finsler metrics on a compact Lie group by exploring the properties of isometries and Killing fields on a Finsler manifold. These geodesics are precisely left cosets of oneparameter subgroups.

Algeria
Bouhannache R. New hypercomplex analysis based on commutative-associative algebra