Novelties of the book "Tensor Trigonometry" (2004/2021eds) in its main topic and in Linear Algebra, Theory of Exact Matrices, different kinds of non-Euclidean Geometries and in Theory of Relativity.

in Part I

– the general inequality for all averages (means) of positive numbers with its important applications:

– – limit method and formula for calculation of a real algebraic equation's roots through coefficients,

– – more strict condition to coefficients of the algebraic equation for roots reality, than Descartes' Rule,

– – complete set of hierarchical quadratic norms of matrices including Frobenius and general norms;

– structures and properties of scalar and matrix coefficients of the characteristic polynomial of a square matrix B with their numerous applications in Algebra with Matrix Theory and in Tensor Trigonometry:

– – minimal annulling polynomial of a square matrix B in its explicit form with powers: $s_i^0 = r_i'' - r_i' + 1$,

– – connections and inequalities for singularity parameters of a square matrix B in its Jordanian form,

– – one-line inferring of the Hamilton-Cayley Theorem and the Kronecker--Capelli Theorem,

– – all orthogonal and oblique paired eigenprojectors (spherical and hyperbolic) of a singular matrix B,

– – Table of Multiplication for all these eigenprojectors with a goal of inferring of projective formulae,

– – Symbolic Octahedron from 8 eigenprojectors of a singular matrix B (see at the Cover and Figure 1),

– – all spherical and hyperbolic paired eigenreflectors tied one-to-one with paired eigenprojectors,

– – complete explicit spectral representation of an arbitrary square matrix B in its decomposition B=P+O;

– the null-prime singular matrix: properties and applications, its general cosine relation and inequality,

– the nxr lineors A as geometric objects with general sine and cosine relations and inequalities for them,

– the null-normal singular matrix: features and applications in Linear Algebra and in Math Analysis,

– the quasi-inverse matrices: their nature and algebraic structures including the Moor-Penrose matrix,

– the explicit algebraic and limit formulae for all these eigenprojectors and quasi-inverse matrices,

– the main variants of complexifications for development of the complex kinds of Tensor Trigonometry.

in main Part II

– the Euclidean Tensor Trigonometry with the middle reflector of any spherical binary angle,

– the quasi-Euclidean binary space (!) of an index q and its quasi-Euclidean Tensor Trigonometry,

– the pseudo-Euclidean binary space of an index q (Poincaré – Minkowski) and its Tensor Trigonometry,

– the projective and motive binary angles and their mutual tensor trigonometric functions,

– the connections of these projective and motive binary angles in their special trigonometric bases,

– the fundamental reflector tensor for joint definition of quasi-Euclidean and pseudo-Euclidean spaces,

– the spherical and hyperbolic orthogonal tensors of principal motions (rotations) in these binary spaces,

– the common orthospherical tensor of secondary motions (rotations) in both these binary spaces,

– the polar decompositions of two-step and multi-step principal rotations in these binary spaces,

– the spherical and hyperbolic non-orthogonal tensors of deformations in these binary spaces.

in Appendix of the book (with the Kunstkammer in the end)

– the elementary tensors of all types of rotations and deformations with own oriented frame axis,

– the Special group of elementary quasi-Euclidean motions on an oriented n-hyperspheroid in $Q^{(n+1)}$,

– the Lorentz group of elementary pseudo-Euclidean motions on paired oriented n-hyperboloids in $P^{(n+1)}$,

– the subgroup of elementary orthospherical rotations as a transection of these two groups only in E_1,

– the orthospherical Thomas precession interpretation as manifestation of Coriolis acceleration in $P^{(3+1)}$,

– the sine-cosine and cosine-sine invariants of spherical binary angles of projective and motive types,

– the sine-cosine and cotangent-cosecant (!) invariants of analogous hyperbolic binary angles,

– the connections of complementary hyperbolic angles in pseudo-Euclidean right triangles, see at Cover,

– the abstract spherical-hyperbolic analogy for correct introducing binary hyperbolic angles in any E,

– the covariant spherical-hyperbolic analogies for connections of spherical and hyperbolic angles in E_1,

– the Lambert covariant sine-tangent analogy for planimetry in both types of non-Euclidean geometries,

– the covariant sine-tangent analogy for connections of all spherical and hyperbolic tensor angles in E_1,

– the especial hyperbolic angle $\omega \approx 0.881$ as the hyperbolic analogue of the spherical angle $\pi/4$ in E_1,

– the contravariant Lobachevskian spherical angle of parallelism in E_1 with the sine-cotangent analogy,

– the covariant angles of parallelism in both non-Euclidean geometries as also the angles of motions,

– the trigonometric vector projective models of spherical and two hyperbolic non-Euclidean geometries,

– the complete 3-sheets hyperbolic-orthospherical geometry with its full Lorentzian group of motions,

– the two vector spaces of the velocities (as tangent one) and supervelocities (as cotangent one) in STR,

– the tensor trigonometric representations of Minkowski hyperboloids identically to their geometries,

– the tensor trigonometric representation of an oriented hyperspheroid identically to its geometry,

– the identity of the orthospherical angle with the angular defect or excess in non-Euclidean figures,

– the Big and Small Pythagorean Theorems for summing two segments in non-Euclidean geometries,

– the hyperbolic equation of a tractrix in only R-factor in the Especial quasi-Euclidean space of index 1,

– the orthospherical–hyperbolic equations of Beltrami pseudosphere in only R-factor in the same space,

– the general law of summing segments or motions in non-Euclidean geometries, and velocities in STR,

– the trigonometric descriptions of relativistic hyperbolic motions by hyperbola, catenary and tractrix,

– the tensor trigonometric description of relativistic pseudoscrewed motions (along a cylinder) in $P^{(2+1)}$,

– the tensor-trigonometric kinematic and dynamic of a body relativistic motions in the space-time $P^{(3+1)}$,

– the differential geometry of world lines in $P^{(3+1)}$ with 4D pseudoanalog of 3D Frenet – Serret theory,

– the 3D Euclidean, 3D pseudo-Euclidean and 4D non-Euclidean two-step metric forms of a world line,

– the non-Euclidean complete three-step metric form of a 4D world line with its absolute curvature,

– the non-dimensional symmetric and non-symmetric trigonometric tensors of motion in $P^{(3+1)}$ and $Q^{(2+1)}$.