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Abstracts and the descriptions of works in
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Abstracts and the descriptions of works in Art and Science submitted to www.IntellectualArchive.com in June 2012

ID #: 410 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Jun 01, 2012

Author: **V.Volov**

Title: **Gas Dynamic Theory Of Local Quasigravity**

Abstract: Abstract

In the present work there was found a class of noninertial frames of reference, which satisfy Einstein "equivalency" principle more than the known noninertial frames - these are strongly swirling gaseous flows.
Field intensity and potential in the mentioned frames of reference are similar to the corresponding values of natural gravity fields, but have the opposite sign. Scalar curvature of this space is negative and proportional to absolute gas temperature .
There was obtained a solution of Einstein equation which refers to type I in Petrov`s classification for cylindrical symmetrical swirling ideal gas with variable angular velocity and nonzero pressure. The equation of state has a more complicated form than the known equations of state in theory of the vacuum.

Web link: ***www.IntellectualArchive.com/getfile.php?file=4hhxWW6Rs8b&orig_file=GAS DYNAMIC THEORY.doc***

ID #: 412 **Natural Sciences / Astronomy / Search for Extraterrestrial Intelligence**

Submitted on: Jun 02, 2012

Author: **Stuart Bowyer**

Title: **A brief history of the search for extraterrestrial intelligence and an appraisal of the future of this endeavor**

Abstract: The idea that credible searches for Extra-Terrestrial Intelligence (ETI) could be carried out were laid out in detail in the (now classic) paper by Morrison and Cocconi (1959). They suggested using the radio band for these searches. Since then radio searches have been carried out by over sixty different groups. No signals from ETI`s have been identified. Most searches did not have high sensitivity and it is not surprising that ETI signals were not detected. It is important to note, however, that these efforts were instrumental in developing new technical capabilities and they helped generate wide interest in this field. In this paper I will briefly discuss the more sensitive searches that have been carried out and some of the other searches that are arguably quite innovative or have been influential in some other manner.

Web link: ***www.IntellectualArchive.com/getfile.php?file=lNkH7A9xOTi&orig_file=Stuart_Bowyer__search_for_extraterrestrial_intelligence.pdf***

ID #: 413 **Natural Sciences / Physics / Optics**

Submitted on: Jun 02, 2012

Author: **Lubomir M. Kovachev**

Title: **Long range filament as a solitary wave**

Abstract: We investigate the propagation in air of laser pulses in linear and nonlinear regime. The mathematical model presented in the paper describes the propagation of pulses with narrow-band spectrum, as well as the evolution of broad-band ones. It is shown that the diffraction of pulses with super-broad spectrum or pulses with a few cycles under the envelope is closer to wave type. For such pulses, a new physical mechanism of balance between non-paraxial diffraction and third order nonlinearity appears. Exact analytical three-dimensional soliton solution in this regime is found. We investigate in more detail the nonlinear third order polarization, taking into account the carrier to envelope phase. This additional phase transforms the third harmonic term to GHz terms, which start to generate radiation when the pulse duration reaches the femtosecond range.

Web link: ***www.IntellectualArchive.com/getfile.php?file=x0KevSfIWK5&orig_file=L_M_Kovachev__Long_***

range_filament.pdf

ID #: 414 **Natural Sciences** / **Physics** / **Optics**

Submitted on: Jun 02, 2012

Author: **Lubomir M. Kovachev, Daniela A. Georgieva**

Title: **A class of localized solutions of the linear and nonlinear wave equations**

Abstract: Following the tradition from nano and picosecond optics, the basic theoretical studies continue to investigate the processes of propagation of femtosecond and attosecond laser pulses with the corresponding envelope equation for narrow-band laser pulses, working in paraxial approximation. We point, that this approximation is not valid for large band pulses. In air due to small dispersion the wave equation as well as the 3D+1 amplitude equation more accurate describe the pulse dynamics. New exact localized solutions of the linear wave and amplitude equations are presented. The solutions discover non-paraxial semi-spherical diffraction of single-cycle and half-cycle laser pulses and a new class of spherically symmetric solution of the wave equation. The propagation of large band optical pulses in nonlinear vacuum is also investigated in the frame of a system of nonlinear wave vector equations. Exact vector soliton solution with own angular momentum is obtained.

Web link: ***www.IntellectualArchive.com/getfile.php?file=hLXMoM7iPfV&orig_file=L_M_Kovachev__wave_equations.pdf***

ID #: 416 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Jun 04, 2012

Author: **Alexander A. Ermolitski**

Title: **Deformations of tensor structures on tagent bundles. Riemannian, Kaehlerian, and hyperKaehlerian manifolds in differential geometry.**

Abstract: Tubular neighborhoods play an important role in differential topology. We have applied these constructions to geometry of almost Hermitian manifolds. At first, we consider deformations of tensor structures on a normal tubular neighborhood of a submanifold in a Riemannian manifold.Further, an almost hyperHermitian structure has been constructed on the tangent bundle TM with help of the Riemannian connection of an almost Hermitian structure on a manifold M then, we consider an embedding of the almost Hermitian manifold M in the corresponding normal tubular neighborhood of the null section in the tangent bundle TM equipped with the deformed almost hyperHermitian structure of the special form. As a result,we have obtained that any smooth manifold M of dimension n can be embedded as a totally geodesic submanifold in a Kaehlerian manifold of dimension 2n and in a hyperKaehlerian manifold of dimension 4n.

Web link: ***www.IntellectualArchive.com/getfile.php?file=GrxsNlBenB4&orig_file=Alexander_Ermolitski__Deformations_of_tensor_structures.pdf***

ID #: 417 **Natural Sciences** / **Physics** / **Optics**

Submitted on: Jun 04, 2012

Author: **Adrian Glaubitz**

Title: **Laser-induced Spin Dynamics in Metallic Multilayers**

Abstract: Electronic excitations in a ferromagnet can trigger ultrafast spin dynamics with potential applications in a speed increase in magnetic recording. The project investigates ultrafast magnetization dynamics, which is driven in metallic layers by ballistic hot electrons. In a ferromagnet these electrons induce a change in the absolute value of the magnetization M through spin-dependent scattering. If the electrons are spin-polarized, scattering at the interface of a noble metal and a ferromagnet results in spin-transfer torque and hence modifies the direction of M. To reveal the underlying mechanisms, we study model systems, which are realized by layers of Au with its large ballistic mean free path and Fe as an itinerant ferromagnet. We aim at understanding ultrafast demagnetization and femtosecond all-optical generation of spin transfer torque effects (excitation of hot electrons with a femtosecond laser). The launched dynamics are probed by magneto-optics in a time-resolved experiment.

Web link: ***www.IntellectualArchive.com/getfile.php?file=JYJFKDUvJRJ&orig_file=Adrian_Glaubitz__Laser-induced_Spin_Dynamics.pdf***

ID #: 418 **Natural Sciences** / **Astronomy** / **Cosmology**

Submitted on: Jun 04, 2012

Author: **L. Cervinka**

Title: **Transformation of the angular power spectrum of the Cosmic Microwave Background (CMB) radiation into reciprocal spaces and consequences of this approach**

Abstract: A formalism of solid state physics has been applied to provide an additional tool for the research of cosmo- logical problems. It is demonstrated how this new approach could be useful in the analysis of the Cosmic Microwave Background (CMB) data. After a transformation of the anisotropy spectrum of relict radiation into a special two-fold reciprocal space it was possible to propose a simple and general description of the interaction of relict photons with the matter by a "relict radiation factor". This factor enabled us to process the transformed CMB anisotropy spectrum by a Fourier transform and thus arrive to a radial electron density distribution function (RDF) in a reciprocal space. As a consequence it was possible to estimate distances between Objects of the order of ~102 [m] and the density of the ordinary matter ~10^-22 [kg*m-3]. Another analysis based on a direct calculation of the CMB radiation spectrum after its transformation into a simple reciprocal space and combined with appropriate structure modelling confirmed the cluster structure. The in- ternal structure of Objects may be formed by Clusters distant ~10 [cm], whereas the internal structure of a Cluster consisted of particles distant ~0.3 [nm]. The work points in favour of clustering processes and to a cluster-like structure of the matter and thus contributes to the understanding of the structure of density fluc- tuations. As a consequence it may shed more light on the structure of the universe in the moment when the universe became transparent for photons. On the basis of our quantitative considerations it was possible to derive the number of particles (protons, helium nuclei, electrons and other particles) in Objects and Clusters and the number of Clusters in an Object.

Web link: ***www.IntellectualArchive.com/getfile.php?file=lpuOZVW2b1R&orig_file=L_Cervinka_article_in_J_Mod_Physics.pdf***

ID #: 421 **Natural Sciences / Computer Sciences / Cognitive science**

Submitted on: Jun 06, 2012

Author: **Wolfgang Konen**

Title: **Self-configuration from a Machine-Learning Perspective**

Abstract: The goal of machine learning is to provide solutions which are trained by data or by experience coming from the environment. Many training algorithms exist and some brilliant successes were achieved. But even in structured environments for machine learning (e.g. data mining or board games), most applications beyond the level of toy problems need careful hand-tuning or human ingenuity (i.e. detection of interesting patterns) or both. We discuss several aspects how self-configuration can help to alleviate these problems. One aspect is the self-configuration by tuning of algorithms, where recent advances have been made in the area of SPO (Sequen- tial Parameter Optimization). Another aspect is the self-configuration by pattern detection or feature construction. Forming multiple features (e.g. random boolean functions) and using algorithms (e.g. random forests) which easily digest many fea- tures can largely increase learning speed. However, a full-fledged theory of feature construction is not yet available and forms a current barrier in machine learning.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Vjl33euhsl4&orig_file=Wolfgang_Konen__Self-configuration.pdf***

ID #: 422 **Natural Sciences / Physics / Electromagnetism**

Submitted on: Jun 06, 2012

Author: **Lyudmila Alexeyeva**

Title: **Newton`s laws for a biquaternionic model of the electro-gravimagnetic field, charges, currents and their interactions**

Abstract: With use the Hamiltonian form of the Maxwell`s equations one biquaternionic model for electro-gravimagnetic (EGM) field is offered. The equations of the interaction of EGM-fields, which are generated by different charge and current, are built. The field analogs of three Newton`s laws are offered for free and interacting charge-currents, as well as total field of interaction. The invariance of these equations at Lorentz transformation is investigated, and, in particular, of the charge-current conservation law. It is shown that, by fields interaction, this law differs from the well-known one. The new modification of the Maxwell`s equations is offered with entering the scalar resistance field in biquaternion of EGM-field tension. Relativistic formulae of the transformation of density of the masses and charge, current, forces and their powers are built. The solution of the Cauchy problem is given for equation of charge-current transformations.

Web link: ***www.IntellectualArchive.com/getfile.php?file=8gwruLQdo3l&orig_file=Lyudmila_Alexeyeva__***

Newtons_laws_for_a_biquaternionic_model.pdf

ID #: 423 **Natural Sciences** / **Mathematics** / **Algebra**

Submitted on: Jun 06, 2012

Author: **Aleks Kleyn**

Title: **Linear Mappings of Free Algebra**

Abstract: For arbitrary F-algebra, in which the operation of addition is defined, I explore biring of matrices of mappings. The sum of matrices is determined by the sum in F-algebra, and the product of matrices is determined by the product of mappings. The system of equations, whose matrix is a matrix of mappings, is called a system of additive equations. I considered the methods of solving system of additive equations. As an example, I consider the solution of a system of linear equations over the complex field provided that the equations contain unknown quantities and their conjugates. Linear mappings of algebra over a commutative ring preserve the operation of addition in algebra and the product of elements of the algebra by elements of the ring. The representation of tensor product A\otimes A in algebra A generates the set of linear transformations of algebra A. The results of this research will be useful for mathematicians and physicists who deal with different algebras.

Web link: ***www.IntellectualArchive.com/getfile.php?file=hj3FsVL9Ysh&orig_file=Aleks_Kleyn__Linear_Mappings_of_Free_Algebra.pdf***

ID #: 424 **Natural Sciences** / **Mathematics** / **Algebra**

Submitted on: Jun 06, 2012

Author: **Aleks Kleyn**

Title: **Algebra of Fractions of Algebra with Conjugation**

Abstract: In the paper, I considered construction of algebra of fractions of algebra with conjugation. I also considered algebra of polynomials and algebra of rational mappings over algebra with conjugation.

Web link: ***www.IntellectualArchive.com/getfile.php?file=C5wZBiEUuin&orig_file=Aleks_Kleyn__Algebra_of_Fractions_of_Algebra_with_Conjugation.pdf***

ID #: 426 **Natural Sciences** / **Mathematics** / **Algebra**

Submitted on: Jun 06, 2012

Author: **Aleks Kleyn**

Title: **Basis of Representation of Universal Algebra**

Abstract: We say that there is a representation of the universal algebra B in the universal algebra A if the set of endomorphisms of the universal algebra A has the structure of universal algebra B. Therefore, the role of representation of the universal algebra is similar to the role of symmetry in geometry and physics. Morphism of the representation is the mapping that conserves the structure of the representation. Exploring of morphisms of the representation leads to the concepts of generating set and basis of representation. The set of automorphisms of the representation of the universal algebra forms the group. Twin representations of this group in basis manifold of the representation are called active and passive representations. Passive representation in basis manifold is underlying of concept of geometric object and the theory of invariants of the representation of the universal algebra.

Web link: ***www.IntellectualArchive.com/getfile.php?file=dcIwv6AhmSL&orig_file=Aleks_Kleyn__Basis_of_Representation_of_Universal_Algebra.pdf***

ID #: 427 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Jun 06, 2012

Author: **Aleks Kleyn**

Title: **Orthogonal Basis and Motion in Finsler Geometry**

Abstract: Finsler space is differentiable manifold for which Minkowski space is the fiber of the tangent bundle. To understand structure of the reference frame in Finsler space, we need to understand the structure of orthonormal basis in Minkowski space. In this paper, I considered the definition of orthonormal basis in Minkowski space, the structure of metric tensor relative to orthonormal basis, procedure of orthogonalization. Linear transformation of Minkowski space which preserves the scalar product is called a motion. Linear transformation which maps the orthonormal basis into an infinitely close

orthonormal basis is infinitesimal motion. An infinitesimal motion maps orthonormal basis into orthonormal basis. The set of infinitesimal motions generates Lie algebra, which acts single transitive on basis manifold of Minkowski space. Element of twin representation is called quasimotion of Minkowski space. Quasimotion of event space is called Lorentz transformation.

Web link: ***www.IntellectualArchive.com/getfile.php?file=tq4sxCMgNWg&orig_file=Aleks_Kleyn__Orthogonal_Basis_and_Motion_in_Finsler_Geometry.pdf***

ID #: 428 **Natural Sciences** / **Mathematics** / **Algebra**

Submitted on: Jun 06, 2012

Author: **Aleks Kleyn**

Title: **Linear Mappings of Quaternion Algebra**

Abstract: In the paper I considered linear and antilinear automorphisms of quaternion algebra. I proved the theorem that there is unique expansion of R-linear mapping of quaternion algebra relative to the given set of linear and antilinear automorphisms.

Web link: ***www.IntellectualArchive.com/getfile.php?file=5KRg2Vhffel&orig_file=Aleks_Kleyn__Linear_Mappings_of_Quaternion_Algebra.pdf***

ID #: 429 **Natural Sciences** / **Mathematics** / **Algebra**

Submitted on: Jun 06, 2012

Author: **Aleks Kleyn**

Title: **C*-Rhapsody**

Abstract: In the paper I considered linear and antilinear mappings of finite dimensional algebra over complex field, as well I considered involution. I considered also an example of C*-algebra.

Web link: ***www.IntellectualArchive.com/getfile.php?file=hreCif59m5U&orig_file=Aleks_Kleyn__C-Rhapsody.pdf***

ID #: 430 **Natural Sciences** / **Mathematics** / **Algebra**

Submitted on: Jun 06, 2012

Author: **Aleks Kleyn**

Title: **Polymorphism of Representations of Universal Algebra**

Abstract: In this paper I consider the polymorpism of representations of universal algebra and tensor product of representations of universal algebra.

Web link: ***www.IntellectualArchive.com/getfile.php?file=jaLswTJ9EQe&orig_file=Aleks_Kleyn__Polymorphism_of_Representations_of_Universal_Algebra.pdf***

ID #: 431 **Natural Sciences** / **Mathematics** / **Graph theory**

Submitted on: Jun 08, 2012

Author: **Marianna Bolla**

Title: **Beyond the Expanders**

Abstract: Expander graphs are widely used in communication problems and construction of error correcting codes. In such graphs, information gets through very quickly. Typically, it is not true for social or biological networks, though we may find a partition of the vertices such that the induced subgraphs on them and the bipartite subgraphs between any pair of them exhibit regular behavior of information flow within or between the subsets. Implications between spectral and regularity properties are discussed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=YSQ8JiLShaL&orig_file=Marianna_Bolla__Beyond_the_Expanders.pdf***

ID #: 432 **Natural Sciences** / **Physics** / **Astrophysics**

Submitted on: Jun 08, 2012

Author: **Amir Levinson**

Title: **Interaction of a magnetized shell with an ambient medium: limits on impulsive magnetic acceleration**

Abstract:

The interaction of relativistic magnetized ejecta with an ambient medium is studied for a range of structures and magnetization of the unshocked ejecta. We particularly focus on the effect of the ambient medium on the dynamics of an impulsive, high-sigma shell. It is found that for sufficiently high values of the initial magnetization σ_0 the evolution of the system is significantly altered by the ambient medium well before the shell reaches its coasting phase. The maximum Lorentz factor of the shell is limited to values well below σ_0; for a shell of initial energy $E = 10^{52}E_{52}$ erg and size $r_0 = 10^{12}T_{30}$ cm expelled into a medium having a uniform density n_i we obtain $\Gamma_{\rm max} \simeq 180(E_{52}/T_{30}^3 n_i)^{1/8}$ in the high sigma limit. The reverse shock and any internal shocks that might form if the source is fluctuating are shown to be very weak. The restriction on the Lorentz factor is more severe for shells propagating in a stellar wind. Intermittent ejection of small sub-shells doesn't seem to help, as the shells merge while still highly magnetized. Lower sigma shells start decelerating after reaching the coasting phase and spreading away. The properties of the reverse shock then depend on the density profiles of the coasting shell and the ambient medium. For a self-similar cold shell the reverse shock becomes strong as it propagates inwards, and the system eventually approaches the self-similar solution derived recently by Nakamura & Shigeyama.

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Web link: ***www.IntellectualArchive.com/getfile.php?file=lKfBuOSh6iK&orig_file=Amir_Levinson__Interaction_of_a_magnetized_shell.pdf***

ID #: 434 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Jun 10, 2012

Author: **Miroslav Pardy**

Title: **Special light trajectories in optical medium**

Abstract: The Fermat principle is used to define trajectories in nonhomogenous optical media. The Poincare model of the Lobachevsky geometry is derived. The index of refraction is determined for the light confined in the circular trajectory in the optical medium.

Web link: ***www.IntellectualArchive.com/getfile.php?file=fxJMEEuNhw3&orig_file=light.pdf***

ID #: 435 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 10, 2012

Author: **Babur M. Mirza**

Title: **Counterpropagating Wavepacket Solutions of the Time-Dependent Schroedinger Equation for a Decaying Potential Field**

Abstract: We investigate wavepacket solutions for time-dependent Schoedinger equation in the presence of an exponentially decaying potential. Assuming for travelling wave solutions the phase to be a linear combination of the space and time coordinates, we obtain two distinct wavepacket solutions for the Schroedinger equation. The wavepackets counterpropagate in space at a constant velocity without any distortion or spreading thus retain their initial form at arbitrarily large distances.

Web link: ***www.IntellectualArchive.com/getfile.php?file=OO7RfbG3ONh&orig_file=Babur_Mirza__Counterpropagating_Wavepacket_Solutions.pdf***

ID #: 436 **Natural Sciences / Biology / Cell biology**

Submitted on: Jun 10, 2012

Author: **Alessandro Fontana**

Title: **Epigenetic Tracking: a model for all biology**

Abstract: "Epigenetic Tracking" is a model of systems of biological cells, able to generate arbitrary 2 or 3-dimensional cellular shapes of any kind and complexity (in terms of number of cells, number of colours, etc.) starting from a single cell. If the complexity of such structures is interpreted as a metaphor for the complexity of biological structures, we can conclude that this model has the potential to generate the complexity typical of living beings. It can be shown how the model is able to reproduce a simplified version of key biological phenomena such as development, the presence of "junk DNA", the phenomenon of ageing and the process of carcinogenesis. The model links properties and behaviour of genes and cells to properties and behaviour of the organism, describing and interpreting the said phenomena with a unified framework: for this reason, we think it can be proposed as a model for all biology. The material contained in this work is not new: the model and its implications have all been described in previous works from a computer-science point of view.

Web link: ***www.IntellectualArchive.com/getfile.php?file=PUb0w10cgO0&orig_file=Alessandro_Fontana__Epigenetic_Tracking.pdf***

ID #: 437 **Natural Sciences / Physics / Particle physics**

Submitted on: Jun 10, 2012

Author: **Boris L. Altshuler**

Title: **Electron neutrino mass scale in spectrum of Dirac equation with the 5-form flux term on the AdS(5)xS(5) background**

Abstract: Dimensional reduction from 10 to 5 dimensions of the IIB supergravity Dirac equation written down on the AdS(5)xS(5) (+ self-dual 5-form) background provides the unambiguous values of bulk masses of Fermions in the effective 5D Randall Sundrum theory. The use of "untwisted" and "twisted" boundary conditions at the UV and IR ends of the warped space-time results in two towers of spectrum of Dirac equation: the ordinary one which is linear in spectral number and the "twisted" one exponentially decreasing with growth of spectral number. Taking into account of the Fermion-5-form interaction gives the electron neutrino mass scale in the "twisted" spectrum of Dirac equation. Profiles in extra space of the eigenfunctions of left and right "neutrinos" drastically differ which may result in the extremely small coupling of light right neutrino with ordinary matter thus joining it to plethora of candidates for Dark Matter.

Web link: ***www.IntellectualArchive.com/getfile.php?file=uQDIM6tO435&orig_file=Boris_Altshuler__Electron_neutrino_mass_scale.pdf***

ID #: 438 **Natural Sciences / Mathematics / Geometry**

Submitted on: Jun 10, 2012

Author: **Alexander Popa**

Title: **Uniform Theory of Geometric Spaces**

Abstract: Isaak Moiseevich Yaglom deduced complete classification of geometric spaces. In this work, supposed to your attention, author formalizes Yaglom`s approach and constructs uniform theory of geometric spaces on analytic level. Among its advantages there are its universality and the fact it is easy to use. It isn`t limited to specific dimension. The theory becomes the background of the GeomSpace project.

Web link: ***www.IntellectualArchive.com/getfile.php?file=x0tKq9LiBCA&orig_file=Alexander_Popa__Uniform_Theory_of_Geometric_Spaces.pdf***

ID #: 439 **Natural Sciences / Mathematics / Geometry**

Submitted on: Jun 11, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: I. Introduction and Formal Theory**

Abstract: In this series of papers I examine a special kind of geometric objects that can be defined in space-time --- five-dimensional tangent vectors. Similar objects exist in any other differentiable manifold, and their dimension is one unit greater than that of the manifold. Like ordinary tangent vectors, the considered five-dimensional vectors and the tensors constructed out of them can be

used for describing certain local quantities and in this capacity find direct application in physics. For example, such familiar physical quantities as the stress-energy and angular momentum tensors prove to be parts of a single five-tensor. In this part of the series five-dimensional tangent vectors are introduced as abstract objects related in a certain way to ordinary four-dimensional tangent vectors. I then make a formal study of their basic algebraic properties and of their differential properties in flat space-time. In conclusion I consider some examples of quantities described by five-vectors and five-tensors.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ghAnoBlifTO&orig_file=Alexander_Krasulin__Five-Dimensional_Tangent_Vectors_1.pdf***

ID #: 440 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Jun 11, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: II. Differential-Geometric Approach**

Abstract: In this part of the series five-dimensional tangent vectors are introduced first as equivalence classes of parametrized curves and then as differential-algebraic operators that act on scalar functions. I then examine their basic algebraic properties and their parallel transport in the particular case where space-time possesses a special local symmetry. After that I give definition to five-dimensional tangent vectors associated with dimensional curve parameters and show that they can be identified with the five-vectors introduced formally in part I. In conclusion I speak about differential forms associated with five-vectors.

Web link: ***www.IntellectualArchive.com/getfile.php?file=aLqKMBUlZ6e&orig_file=Alexander_Krasulin__Five-Dimensional_Tangent_Vectors_2.pdf***

ID #: 441 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Jun 11, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: III. Some Applications**

Abstract: In this part of the series I show how five-tensors can be used for describing in a coordinate-independent way finite and infinitesimal Poincare transformations in flat space-time. As an illustration, I reformulate the classical mechanics of a perfectly rigid body in terms of the analogs of five-vectors in three-dimensional Euclidean space. I then introduce the notion of the bivector derivative for scalar, four-vector and four-tensor fields in flat space-time and calculate its analog in three-dimensional Euclidean space for the Lagrange function of a system of several point particles in classical nonrelativistic mechanics.

Web link: ***www.IntellectualArchive.com/getfile.php?file=gXYRCNZgJk7&orig_file=Alexander_Krasulin__Five-Dimensional_Tangent_Vectors_3.pdf***

ID #: 442 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Jun 11, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: IV. Generalization of Exterior Calculus**

Abstract: This part of the series is devoted to the generalization of exterior differential calculus. I give definition to the integral of a five-vector form over a limited space-time volume of appropriate dimension; extend the notion of the exterior derivative to the case of five-vector forms; and formulate the corresponding analogs of the generalized Stokes theorem and of the Poincare theorem about closed forms. I then consider the five-vector generalization of the exterior derivative itself; prove a statement similar to the Poincare theorem; define the corresponding five-vector generalization of flux; and derive the analog of the formula for integration by parts. I illustrate the ideas developed in this paper by reformulating the Lagrange formalism for classical scalar fields in terms of five-vector forms. In conclusion, I briefly discuss the five-vector analog of the Levi-Civita tensor and dual forms.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ciK8aortk6n&orig_file=Alexander_Krasulin__Five-Dimensional_Tangent_Vectors_4.pdf***

ID #: 443 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Jun 11, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: V. Generalization of Covariant Derivative**

Abstract: In this part of the series I discuss the five-vector generalizations of affine connection and gauge fields. I also give definition to the exterior derivative of nonscalar-valued five-vector forms and consider the five-vector analogs of the field strength tensor. In conclusion I discuss the nonspacetime analogs of five-vectors.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Lh2olefpIvG&orig_file=Alexander_Krasulin__Five-Dimensional_Tangent_Vectors_5.pdf***

ID #: 444 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Jun 11, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: VI. Bivector Derivative and Its Application**

Abstract: This is the sixth, concluding part of a series of papers the first five of which have been submitted to the present archive in mid 1998 and published as INR preprints in 1999. The present paper was printed as an INR preprint, too, but for nonscientific reasons was never made public in any form, electronic or hard-copy. In it I define the bivector derivative for four- and five-vector fields in the case of arbitrary Riemannian geometry; examine a more general case of five-vector affine connection; introduce the five-vector analog of the curvature tensor; and consider a possible five-vector generalization of the Einstein and Kibble-Sciama equations. In conclusion, I define the bivector derivative for the fields of nonspacetime vectors and tensors and derive a possible five-vector generalization of Maxwell`s equation.

Web link: ***www.IntellectualArchive.com/getfile.php?file=80FODsXEfAb&orig_file=Alexander_Krasulin__Five-Dimensional_Tangent_Vectors_6.pdf***

ID #: 445 **Natural Sciences** / **Chemistry** / **Chemical physics**

Submitted on: Jun 11, 2012

Author: **Christopher G. Jesudason**

Title: **Induced parameter-dependent optimization method applied to reaction rate determination**

Abstract: Parameter fitting of data to a proposed equation almost always consider these parameters as independent variables. Here, the method proposed optimizes an arbitrary number of variables by the minimization of a function of a single variable. Such a technique avoids problems associated with multiple minima and maxima because of the large number of parameters, and could increase the accuracy of the determination by cutting down on machine errors. An algorithm for this optimization scheme is provided and applied to the determination of the rate constant and final concentration parameters for a first order and second order chemical reaction.

Web link: ***www.IntellectualArchive.com/getfile.php?file=agnkL370YLU&orig_file=Christopher_Jesudason__Induced_optimization.pdf***

ID #: 446 **Natural Sciences** / **Computer Sciences** / **Analysis of algorithms**

Submitted on: Jun 11, 2012

Author: **Cyril Prissette**

Title: **An Algorithm to List All the Fixed-Point Free Involutions on a Finite Set**

Abstract: An involution on a finite set is a bijection such as I(I(e))=e for all the element of the set. A fixed-point free involution on a finite set is an involution such as I(e)=e for none element of the set. In this article, the fixed-point free involutions are represented as partitions of the set and some properties linked to this representation are exhibited. Then an optimal algorithm to list all the fixed-point free involutions is presented. Its soundness relies on the representation of the fixed-point free involutions as partitions. Finally, an implementation of the algorithm is proposed, with an effective data representation.

Web link: ***www.IntellectualArchive.com/getfile.php?file=4S7XOfL58NY&orig_file=Cyril_Prissette__Fixed-Point_Free_Involutions.pdf***

ID #: 447 **Natural Sciences** / **Mathematics** / **Combinatorics**

Submitted on: Jun 12, 2012

Author: **Elise Janvresse, Steve Kalikow, Thierry De La Rue**

Title: **Transposition game**

Abstract: We introduce a two-player game, in which each player extends a given sequence by picking a free element in a domain D of the real line. The aim of the players is to control the parity of the number of transpositions necessary to put the final sequence in order. We will see that the winner can be the last player, the second last player, the first player, the second player, the person who wants the parity to end up even or the person who wants the parity to end up odd. A special case of the game can be reduced to a game with nontrivial winning strategy, but describable in so simple a way that children can understand it and enjoy playing it.

Web link: ***www.IntellectualArchive.com/getfile.php?file=lecNMBAJE7N&orig_file=Steve_Kalikow__Transposition_game.pdf***

ID #: 448 **Natural Sciences** / **Physics** / **Quantum field theory**

Submitted on: Jun 12, 2012

Author: **Dominik Janzing**

Title: **Is there a physically universal cellular automaton or Hamiltonian?**

Abstract: It is known that both quantum and classical cellular automata (CA) exist that are computationally universal in the sense that they can simulate, after appropriate initialization, any quantum or classical computation, respectively. Here we introduce a different notion of universality: a CA is called physically universal if every transformation on any finite region can be (approximately) implemented by the autonomous time evolution of the system after the complement of the region has been initialized in an appropriate way. We pose the question of whether physically universal CAs exist. Such CAs would provide a model of the world where the boundary between a physical system and its controller can be consistently shifted, in analogy to the Heisenberg cut for the quantum measurement problem.

Web link: ***www.IntellectualArchive.com/getfile.php?file=uXUFKNhigjK&orig_file=Dominik_Janzing__physically_universal_cellular_automaton.pdf***

ID #: 449 **Natural Sciences** / **Physics** / **Particle physics**

Submitted on: Jun 12, 2012

Author: **F. A. da Costa**

Title: **Tricriticality and Reentrance in a Naive Spin-Glass Model**

Abstract: In this paper a spin-1 spin-glass model under the presence of a uniform crystal field is investigated. It is shown that the model presents both continuous and first-order phase transition separated by a tricritical point. The phase diagram is obtained within the replica-symmetric solution and exhibits reentrance phenomena at low temperatures. Possibly it is the simplest model which can describe inverse freezing phenomena.

Web link: ***www.IntellectualArchive.com/getfile.php?file=jQZ18jnq313&orig_file=F_A_da_Costa__Tricriticality_and_Reentrance.pdf***

ID #: 450 **Natural Sciences** / **Physics** / **Quantum field theory**

Submitted on: Jun 12, 2012

Author: **Dong-Sheng Wang**

Title: **On the Quantum Structure**

Abstract: Quantum mechanics is a special kind of description of motion. The concept of wave function itself implies the openness of quantum system. We show that quantum mechanics describes the quantum correlation, i.e., entanglement, and information in a new kind of space, tangnet T^2, where exist the basic quantum structure of qubit and the universal out-in symmetry. This work tries to form a new view to the fundamental problems of the foundation of quantum mechanics.

Web link: ***www.IntellectualArchive.com/getfile.php?file=wuB5kKIi8UE&orig_file=Dongsheng_Wang__On_the_Quantum_Structure.pdf***

ID #: 451 **Natural Sciences** / **Physics** / **Quantum field theory**

Submitted on: Jun 12, 2012

Author: **Dong-Sheng Wang**

Title: **Superposition and Entanglement from Quantum Scope**

Abstract: The abstract framework of quantum mechanics (QM) causes the well-known weirdness, which leads to the field of foundation of QM. We constructed the new concept, i.e., scope, to lay the foundation of quantum coherence and openness, also the principles of superposition and entanglement. We studied analytically and quantitatively the quantum correlations and information, also we discussed the physical essence of the existed entanglement measures. We compared with several other approaches to the foundation of QM, and we stated that the concept of scope is unique and has not been demonstrated before.

Web link: ***www.IntellectualArchive.com/getfile.php?file=eZjTLJeKImK&orig_file=Dongsheng_Wang__Superposition_and_Entanglement.pdf***

ID #: 452 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 12, 2012

Author: **Dong-Sheng Wang**

Title: **Coherence Frame, Entanglement Conservation, and Einselection**

Abstract: In this paper, the theory of coherence frame is developed. Two kinds of coherence frame are classified. Under coherence frame, the entanglement is conserved in the entanglement swapping process, without entanglement sudden death and birth. The einselection method for the preferred basis problem in the entangle process is shown as incomplete.

Web link: ***www.IntellectualArchive.com/getfile.php?file=uM9liphnCHg&orig_file=Dongsheng_Wang__Coherence_Frame.pdf***

ID #: 453 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 12, 2012

Author: **Dong-Sheng Wang**

Title: **Quantum Fine-Grained Entropy**

Abstract: Regarding the strange properties of quantum entropy and entanglement, e.g., the negative quantum conditional entropy, we revisited the foundations of quantum entropy, namely, von Neumann entropy, and raised the new method of quantum fine-grained entropy. With the applications in entanglement theory, quantum information processing, and quantum thermodynamics, we demonstrated the capability of quantum fine-grained entropy to resolve some notable confusions and problems, including the measure of entanglement and quantumness, the additivity conjecture of entanglement of formation etc, and the definition of temperature for single quantum system.

Web link: ***www.IntellectualArchive.com/getfile.php?file=PJhJb36ONfY&orig_file=Dongsheng_Wang__Quantum_Fine-Grained_Entropy.pdf***

ID #: 454 **Natural Sciences / Physics / Particle physics**

Submitted on: Jun 13, 2012

Author: **G. Sardin**

Title: **The proton gyromagnetic g-factor: An electromagnetic model**

Abstract: Abstract

So far, the Standard Model of Elementary Particles has not succeeded getting a trustworthy account of the proton spin, which remains an enigma. This hindrance is known as the proton spin crisis, owing to the experimental evidence already from 1988 suggesting that little or none of the proton`s spin would come from the spin of the quarks. This prompted theorists to a flood of guessworks about the proton`s spin. Since it remains unsolved, in the framework of new physics an exploratory approach based on a novel paradigm is proposed, which brings a renewed access to this challenge, through its reciprocal relationship with the g-factor.

The Orbital Model of Elementary Particles allows deepening the physical significance of the gyromagnetic g-factor by correlating it to structural and inner dynamical parameters. This new approach provides a further insight to the correlation between magnetic moment and mass of elementary particles, through the relationship between the electromagnetic radius and wavelength of their structure. The deBroglie and Compton wavelengths can be used equivalently. The structure of elementary particles can be efficiently approached by considering them to be defined by two inner dynamics, a rotation and an oscillation of the electric charge tracing the structuring orbital. To the rotation of the electric charge is associated the magnetic moment, which depends on the orbital radius, and to its oscillation is associated the mass, which depends on the structure wavelength. The

relationship between the two dynamics, gyratory and oscillatory, defines the quantization of the structuring orbital. Here its application is addressed to the proton. Its g-factor is related to its structural state. Its reduced structure wavelength and electromagnetic radius differ slightly and their ratio r/Î» fixes the value of the g-factor.

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Web link: ***www.IntellectualArchive.com/getfile.php?file=HgHaMRg1Nqe&orig_file=0912.4962v1.pdf***

ID #: 455 **Natural Sciences / Mathematics / Number theory**

Submitted on: Jun 14, 2012

Author: **Farzali Izadi**

Title: **Congruent Numbers Via the Pell Equation and its Analogous Counterpart**

Abstract: The aim of this expository article is twofold. The first is to introduce several polynomials of one variable as well as two variables defined on the positive integers with values as congruent numbers. The second is to present connections between Pythagorean triples and the Pell equation x^2-dy^2=1 plus its analogous counterpart x^2-dy^2=-1 which give rise to congruent numbers n with arbitrarily many prime factors.

Web link: ***www.IntellectualArchive.com/getfile.php?file=tPeC2SvLngd&orig_file=Farzali_Izadi__Congruent_Numbers.pdf***

ID #: 456 **Social Sciences / Economics / Financial**

Submitted on: Jun 14, 2012

Author: **David Wakyiku**

Title: **Testing the Capital Asset Pricing Model (CAPM) on the Uganda Stock Exchange**

Abstract: This paper examines the validity of the Capital Asset Pricing Model (CAPM) on the Ugandan stock market using monthly stock returns from 10 of the 11 companies listed on the Uganda Stock Exchange (USE), for the period 1st March 2007 to 10th November 2009. Due to the absence of readily available Uganda Stock Exchange(USE) data, and the placement of daily price lists in pdf only, the article also discusses the procedures taken to mine the data needed. The securities were all put in one portfolio in order to diversify away the firm-specific part of returns thereby enhancing the precision of the beta estimates. This paper should be of interest to both Ugandan and non-Ugandan investors and market researchers. While many developing countries have legal restrictions against foreign participation in capital and money markets, this is not so in Uganda, where it has become part of government policy to encourage foreign capital in flow, inorder to stimulate the development of the small and underdeveloped markets. The Black, Jensen, and Scholes (1972) CAPM version is examined in this article.

Web link: ***www.IntellectualArchive.com/getfile.php?file=R1hUWSp1K6C&orig_file=David_Wakyiku__Testing_the_Capital_Asset_Pricing_Model.pdf***

ID #: 457 **Natural Sciences / Astronomy / Cosmology**

Submitted on: Jun 14, 2012

Author: **H. Alavirad**

Title: **Slowly Rotating Black Holes in Brans-Dicke-Maxwell Theory**

Abstract: In this paper, we construct a class of (n+1)-dimensional (n >= 4) slowly rotating black hole solutions in Brans-Dicke-Maxwell theory with a quadratic potential. These solutions can represent black holes with inner and outer event horizons, an extreme black hole and a naked singularity and they are neither asymptotically flat nor (anti)-de Sitter. We compute the Euclidean action and use it to obtain the conserved and thermodynamics quantities such as entropy, which does not obey the area law. We also compute the angular momentum and the gyromagnetic ratio for these type of black holes where the gyromagnetic ratio is modified in Brans-Dicke theory compared to the Einstein theory.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Uqijex3fRNo&orig_file=H_Alavirad__Slowly_Rotating_Black_Holes.pdf***

ID #: 458 **Natural Sciences / Computer Sciences / Computer architecture**

Submitted on: Jun 14, 2012

Author: **Hans-Rudolf Thomann**

Title: **Instant Computing - A New Computation Paradigm**

Abstract: Voltage peaks on a conventional computer`s power lines allow for the well-known dangerous DPA attacks. We show that measurement of a quantum computer`s transient state during a computational step reveals information about a complete computation of arbitrary length, which can be extracted by repeated probing, if the computer is suitably programmed. Instant computing, as we name this mode of operation, recognizes for any total or partial recursive function arguments lying in the domain of definition and yields their function value with arbitrary small error probability in probabilistic linear time. This implies recognition of (not necessarily recursively enumerable) complements of recursively enumerable sets and the solution of the halting problem. Future quantum computers are shown to be likely to allow for instant computing, and some consequences are pointed out.

Web link: ***www.IntellectualArchive.com/getfile.php?file=gASZFXRCE6i&orig_file=Hans-Rudolf_Thomann__Instant_Computing.pdf***

ID #: 459 **Natural Sciences** / **Computer Sciences** / **Computer architecture**

Submitted on: Jun 14, 2012

Author: **Hans-Rudolf Thomann**

Title: **HowTo Authenticate and Encrypt**

Abstract: Recently, various side-channel attacks on widely used encryption methods have been discovered. Extensive research is currently undertaken to develop new types of combined encryption and authentication mechanisms. Developers of security systems ask whether to implement methods recommended by international standards or to choose one of the new proposals. We explain the nature of the attacks and how they can be avoided, and recommend a sound, provably secure solution: the CCM standard.

Web link: ***www.IntellectualArchive.com/getfile.php?file=k9lm8UJo14j&orig_file=Hans-Rudolf_Thomann__HowTo_Authenticate_and_Encrypt.pdf***

ID #: 460 **Natural Sciences** / **Physics** / **Quantum field theory**

Submitted on: Jun 14, 2012

Author: **Hans-Rudolf Thomann**

Title: **Orthogonal Evolution and Anticipation**

Abstract: Quantum states evolving at equidistant steps into a set of mutually orthogonal states of finite or infinite cardinality p exhibit an interesting physical effect. The analysis of the amplitudes of the state at half the step time with the elements of this set (the anticipation amplitudes) shows, that for randomly chosen states measurements of the state at half-step time reveal information about the states at full step time, anticipating future states and reflecting past states with significant probability. For fixed N and p to infinity, the probability to measure a state which is N steps apart in future or past exceeds a constant lower bound. We characterize the spectrum, establish an analog to Plack`s relation, define a random sampling scheme, analyze the resulting distribution of the anticipation probabilities and point out applications.

Web link: ***www.IntellectualArchive.com/getfile.php?file=djbheE0A0wM&orig_file=Hans-Rudolf_Thomann__Orthogonal_Evolution_and_Anticipation.pdf***

ID #: 461 **Natural Sciences** / **Physics** / **Quantum field theory**

Submitted on: Jun 14, 2012

Author: **Hans-Rudolf Thomann**

Title: **Quantum Evolution and Anticipation**

Abstract: In a previous paper we have investigated quantum states evolving into mutually orthogonal states at equidistant times, and the quantum anticipation effect exhibited by measurements at one half step. Here we extend our analyzes of quantum anticipation to general type quantum evolutions and spectral measures and prove that quantum evolutions possessing an embedded orthogonal evolution are characterized by positive joint spectral measure. Furthermore, we categorize quantum evolution, assess anticipation strength and provide a framework of analytic tools and results, thus preparing for further investigation and experimental verification of anticipation in concrete physical situations such as the H-atom, which we have found to exhibit anticipation.

Web link: ***www.IntellectualArchive.com/getfile.php?file=9MtH8TMF5pO&orig_file=Hans-Rudolf_Thomann__Quantum_Evolution_and_Anticipation.pdf***

ID #: 462 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 14, 2012

Author: **Hans-Rudolf Thomann**

Title: **Quantum Anticipation Explorer**

Abstract: Quantum anticipation explorer is a computer program allowing the numerical exploration of quantum anticipation for H-Atom, equidistant, random and custom spectra. This tool determines the anticipation strength at those times orthogonal evolution is possible. This paper is the user`s guide explaining its capabilities, installation and usage, and documenting the mathematics and algorithms implemented in the software.

Web link: ***www.IntellectualArchive.com/getfile.php?file=UjiJlhJNhhS&orig_file=Hans-Rudolf_Thomann__Quantum_Anticipation_Explorer.pdf***

ID #: 463 **Natural Sciences / Mathematics / Combinatorics**

Submitted on: Jun 15, 2012

Author: **Giuseppe Scollo**

Title: **An integration of Euler`s pentagonal partition**

Abstract: A recurrent formula is presented, for the enumeration of the compositions of positive integers as sums over multisets of positive integers, that closely resembles Euler`s recurrence based on the pentagonal numbers, but where the coefficients result from a discrete integration of Euler`s coefficients. Both a bijective proof and one based on generating functions show the equivalence of the subject recurrences.

Web link: ***www.IntellectualArchive.com/getfile.php?file=522SROAYoEK&orig_file=Giuseppe_Scollo__Eulers_pentagonal_partition.pdf***

ID #: 464 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 15, 2012

Author: **Gerd Niestegge**

Title: **Physical Reality and Information - Three Hypotheses**

Abstract: Since its emergence, quantum mechanics has been a challenge for an understanding of reality which is based on our intuition in a classical world. Nevertheless, it has often been tried to impose this understanding of reality on quantum theory - with limited success. Instead, it might be a better alternative to redefine the meaning of physical reality. This is the objective of the paper. A consideration of the quantum measurement process, conditional probabilities and some well-known typical quantum physical experiments provides the reasoning for the following three hypotheses: (1) Prior to a first measurement, a physical system is not in a quantum state. (2) Physical reality is all that and only that about which (classical) information is available in the universe. (3) Information creation is an independent process and is not covered by the Schroedinger equation. It is the first step of the quantum measurement process and does not have a classical counterpart.

Web link: ***www.IntellectualArchive.com/getfile.php?file=7cH4wECkIKv&orig_file=Gerd_Niestegge__Physical_Reality_and_Information.pdf***

ID #: 465 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 15, 2012

Author: **Dominik Janzing**

Title: **On causally asymmetric versions of Occam`s Razor and their relation to thermodynamics**

Abstract: In real-life statistical data, it seems that conditional probabilities for the effect given their causes tend to be less complex and smoother than conditionals for causes, given their effects. We have recently proposed and tested methods for causal inference in machine learning using a formalization of this principle. Here we try to provide some theoretical justification for causal inference methods based upon such a "causally asymmetric" interpretation of Occam`s Razor. To this end, we discuss toy models of cause-effect relations from classical and quantum physics as well as computer science in the context of various aspects of complexity. We argue that this asymmetry of the statistical dependences between cause and effect has a thermodynamic origin. The essential link is the

tendency of the environment to provide independent background noise realized by physical systems that are initially uncorrelated with the system under consideration rather than being finally uncorrelated.

Web link: ***www.IntellectualArchive.com/getfile.php?file=76hoJeBOpWo&orig_file=Dominik_Janzing__Occams_Razor.pdf***

ID #: 466 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Jun 15, 2012

Author: **I. V. Solovyev**

Title: **Realistic Modeling of Complex Oxide Materials**

Abstract: Since electronic and magnetic properties of many transition-metal oxides can be efficiently controlled by external factors such as the temperature, pressure, electric or magnetic field, they are regarded as promising materials for various applications. From the viewpoint of electronic structure, these phenomena are frequently related to the behavior of a small group of states close to the Fermi level. The basic idea of this project is to construct a low-energy model for the states near the Fermi level on the basis of first-principles density functional theory, and to study this model by modern many-body techniques. After a brief review of the method, the abilities of this approach will be illustrated on a number of examples, including multiferroic manganites and spin-orbital-lattice coupled phenomena in RVO3 (R being the three-valent element).

Web link: ***www.IntellectualArchive.com/getfile.php?file=9Ci42ZMwg09&orig_file=I_V_Solovyev__Complex_Oxide_Materials.pdf***

ID #: 467 **Natural Sciences / Physics / Heat and thermodynamics**

Submitted on: Jun 15, 2012

Author: **Hans R. Moser**

Title: **Does the second law of thermodynamics really hold good without exception?**

Abstract: A major part of the many thermally driven processes in our natural environment as well as in engineering solutions of Carnot-type machinery is based on the second law of thermodynamics (or principle of entropy increase). An interesting link between macroscopically observable quantities of an ensemble (state variables) and the thermal velocity of its individual constituents such as molecules in a liquid is provided by the Brownian motion of suspended larger particles. We postulate a "frustrated Brownian motion" that occurs if these particles get partially trapped in an environment of suitable geometrical conditions. This dissipates a small fraction of the kinetic energy attended with the Brownian motion and deposits it inside the trap, and so this constitutes a mechanism that by itself transfers thermal energy from cold to warm. We note that this is just a marginally admitted, slowly evolving effect driven by a thermodynamic quasi-equilibrium, thus being of limited efficiency in terms of energy density attainable per unit of time. However, a simple experiment suggests that this process indeed is allowed to take place, and the envisaged applications then are straightforward.

Web link: ***www.IntellectualArchive.com/getfile.php?file=kJ5TcSlQ5up&orig_file=Hans_R_Moser__the_second_law_of_thermodynamics.pdf***

ID #: 468 **Natural Sciences / Mathematics / Probability**

Submitted on: Jun 16, 2012

Author: **Ida Kruk, Francesco Russo**

Title: **Malliavin-Skorohod calculus and Paley-Wiener integral for covariance singular processes**

Abstract: We develop a stochastic analysis for a Gaussian process X with singular covariance by an intrinsic procedure focusing on several examples such as covariance measure structure processes, bifractional Brownian motion, processes with stationary increments. We introduce some new spaces associated with the self-reproducing kernel space and we define the Paley-Wiener integral of first and second order even when X is only a square integrable process continuous in L^2. If X has stationary increments, we provide necessary and sufficient conditions so that its paths belong to the self-reproducing kernel space. We develop Skorohod calculus and its relation with symmetric-Stratonovich type integrals and two types of Ito`s formula. One of Skorohod type, which works under very general (even very singular) conditions for the covariance; the second one of symmetric-Stratonovich type, which works, when the covariance is at least as regular as the one of a fractional Brownian motion of Hurst index equal to H = 1/4.

Web link: ***www.IntellectualArchive.com/getfile.php?file=LJTPZxNLDMk&orig_file=Ida_Kruk__Malliavin-Skorohod_calculus.pdf***

ID #: 469 **Natural Sciences / Physics / Astrophysics**

Submitted on: Jun 16, 2012

Author: **Ilya I. Royzen**

Title: **QCD against black holes of a star mass?**

Abstract: Along with compacting baryon (neutron) spacing in a neutron star (NS), two very important factors come into play side by side: the lack of the NS gravitational self-stabilization against shutting to black hole (BH) and the phase transition - color deconfinement and QCD-vacuum reconstruction - within the nuclear matter the NS is composed of. That is why both phenomena should be taken into account at once, as the gravitational collapse is considered. Since, under the above transition, the hadronic-phase (HPh) vacuum (filled up with gluon- and chiral $q\bar q$-condensates) turns into the "empty" (perturbation) subhadronic-phase (SHPh) one and, thus, the formerly (very high) pressure falls down rather abruptly, the formerly cold nuclear medium starts imploding almost freely into the new vacuum.

Web link: ***www.IntellectualArchive.com/getfile.php?file=BhLGrb9uNf6&orig_file=Ilya_Royzen__QCD_against_black_holes.pdf***

ID #: 470 **Natural Sciences / Physics / Astrophysics**

Submitted on: Jun 16, 2012

Author: **Ilya I. Royzen**

Title: **Non-trivial QCD vacuum against black holes of a stellar mass**

Abstract: Presentation of author`s talk at "Ginzburg Conference on Physics (May 28 - June 2, Lebedev Institute, Moscow)"

Web link: ***www.IntellectualArchive.com/getfile.php?file=fK6X8uXEj7M&orig_file=Ilya_Royzen__QCD-vs-BH_present.pdf***

ID #: 472 **Social Sciences / Other / Management**

Submitted on: Jun 17, 2012

Author: **Carlos Pedro Goncalves**

Title: **Risk Governance - A framework for risk science-based decision support systems**

Abstract: The present article synthesizes a general approach to the development of risk governance decision support systems, based upon the interdisciplinary dialogue between risk science and the complexity sciences. A conceptual review of risk science and the three main schools of the complexity sciences (the Santa Fe School, the Stuttgart School and the Brussels-Austin School) is provided and addressed with regards to the new challenges faced by organizations in their need for adaptation to interconnected risk situations and the dynamics of risk in networks.

Web link: ***www.IntellectualArchive.com/getfile.php?file=hUOZ2eQIg9V&orig_file=Risk Governance.pdf***

ID #: 473 **Natural Sciences / Mathematics / Statistics**

Submitted on: Jun 17, 2012

Author: **N.P. Kopytov, E.A. Mityushov**

Title: **UNIVERSAL ALGORITHM OF UNIFORM DISTRIBUTION OF POINTS ON ARBITRARY ANALITIC SURFACES IN THREE-DIMENSIONAL SPACE**

Abstract: The problem of uniform distribution of points on arbitrary analytic surfaces in three-dimensional space is considered. A universal algorithm for uniform distribution of points on analytic surfaces defined by the parametric method is proposed. Neumann`s method for generating a two-dimensional random variable by using a known density function of the joint distribution is described. Graphical presentations of the proposed algorithm obtained with the help of Wolfram Mathematica 7.0 are demonstrated. The examples of uniform distribution of points on surfaces of sphere, torus, helicoid, "falling drop" and surface of Klein bottle are presented.

Web link: ***www.IntellectualArchive.com/getfile.php?file=KCN77GxDjvv&orig_file=UNIVERSAL ALGORITHM OF UNIFORM DISTRIBUTION OF POINTS ON ARBITRARY ANALITIC SURFACES IN THREE-DIMENSIONAL SPACE.pdf***

ID #: 474 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Jun 18, 2012

Author: **Thomas L. Wilson**

Title: **A New Perspective On Solving Two Cosmological Constant Problems**

Abstract: A new approach to solving two of the cosmological constant problems (CCPs) is proposed by introducing the Abbott-Deser (AD) method for defining global energy and Killing charges in asymptotic de Sitter space as the only consistent means for defining the ground-state vacuum for the CCP. That granted, Einstein gravity will also need to be modified at short distance scales, using instead a nonminimally coupled scalar-tensor theory of gravitation that provides for the existence of QCD`s two-phase vacuum having two different zero-point energy states as a function of temperature. Einstein gravity alone cannot accomplish this. The scalar field will be taken from bag theory in hadron physics. A small graviton mass mg ~10^-33 eV naturally appears as a secondary effect, induced by the existence of a nonzero CC (Lambda not equal to 0), with a smooth zero-mass limit mg ->0 as Lambda->0. This mass is shown to be related to the cosmological event horizon in asymptotic de Sitter space.

Web link: ***www.IntellectualArchive.com/getfile.php?file=0MQljbxVVhr&orig_file=Wilson_NewStrategyCCP.pdf***

ID #: 475 **Natural Sciences** / **Physics** / **Relativity**

Submitted on: Jun 18, 2012

Author: **I.L. Zhogin**

Title: **One more fitting (D=5) of Supernovae red shifts**

Abstract: Supernovae red shifts are fitted in a simple 5D model: the galaxies are assumed to be enclosed in a giant S^3-spherical shell which expands (ultra) relativistically in a (1+4)D Minkowski space. This model, as compared with the kinematical (1+3)D model of Prof Farley, goes in line with the Copernican principle: any galaxy observes the same isotropic distribution of distant supernovae, as well as the same Hubble plot of distance modulus μ vs red shift z. A good fit is obtained (no free parameters); it coincides with Farley`s fit at low z, while shows some more luminosity at high z, leading to 1% decrease in the true distance modulus (and 50% increase in luminosity) at z~2. The model proposed can be also interpreted as a FLRW-like model with the scale factor a(t)=t/t_0; this could not be a solution of general relativity (5D GR is also unsuitable--it has no longitudinal polarization). However, there still exists the other theory (with D=5 and no singularities in solutions), the other game in the town, which seems to be able to do the job.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Bc756qvjHm9&orig_file=I_L_Zhogin__One_more_fitting_of_Supernovae_red_shifts.pdf***

ID #: 476 **Natural Sciences** / **Physics** / **Relativity**

Submitted on: Jun 18, 2012

Author: **I.L. Zhogin**

Title: **Absolute parallelism, modified gravity, and suppression of gravitational short waves**

Abstract: There is a unique variant of Absolute Parallelism, which is very simple as it has no free parameters: nothing (nor D=5) can be changed if to keep the theory safe from emerging singularities of solutions. On the contrary, eternal solutions of this theory, due to the linear instability of the trivial solution, should be of great complexity which can in some scenarios (with a set of slowly varying parameters of solutions) provide a few phenomenological models including a modified (better to say, new or another) gravity and an expanding-shell cosmology (the longitudinal polarization gives the anti-Milne model). The former looks (mostly) like a variant of tensor-Ricci-squared gravity on a brane of a huge scale L along the extra-dimension. The correction to Newton`s law of gravity, which depends in this theory on two parameters (bi-Laplace equation) and behaves as 1/r on large scales, r>L (kpc>L>pc), can start from zero (the Rindler term vanishes) if a constraint is imposed on these parameters.

Web link: ***www.IntellectualArchive.com/getfile.php?file=qltjNFvG9ft&orig_file=I_L_Zhogin__Absolute_parallelism.pdf***

ID #: 477 **Natural Sciences** / **Physics** / **Quantum field theory**

Submitted on: Jun 18, 2012

Author: **Fedor Herbut**

Title: **A Theory of Quantum Preparation**

Abstract: Based on an analysis of two conventional preparators, the Stern-Gerlach and the hole-in-the-screen ones, it is argued that four entities can be taken as the basic ingredients of a rather general theory of a quantum preparator. These are the composite-system (object plus preparator) state coming about as a result of a suitable interaction between the subsystems, a suitable preparator projector called the triggering event, the conditional quantum state (density operator) of the quantum object coming about as a consequence of the occurrence of the triggering event on the preparator, and, finally, a unitary evolution operator of the object subsystem acting after preparation. The concepts of a general conditional state and of retrospective apparent ideal occurrence (which appears in the theory) are discussed in considerable detail. Ideal occurrence and the selective Luders formula, which are made use of, are reviewed. Dynamical and geometrical preparators are distinguished in the general theory. They are described by the same entities in the same way, but in terms of different physical mechanisms from the point of view of standard interpretation with collapse.

Web link: ***www.IntellectualArchive.com/getfile.php?file=L75484iMXnB&orig_file=Fedor_Herbut__A_Theory_of_Quantum_Preparation.pdf***

ID #: 478 **Natural Sciences / Mathematics / Calculus / Analysis**

Submitted on: Jun 18, 2012

Author: **Jan Kisynski**

Title: **The Petrovskii correctness and semigroups of operators**

Abstract:

Let $P(\partial/\partial x)$ be an $m \times n$ matrix whose entries are PDO on $\mathbb{R}^n$ with constant coefficients, and let $\mathcal{S}(\mathbb{R}^n)$ be the space of infinitely differentiable rapidly decreasing functions on $\mathbb{R}^n$. It is proved that $P(\partial/\partial x)|_{(\mathcal{S}(\mathbb{R}^n))^m}$ is the infinitesimal generator of a (C_0)-semigroup $(S_t)_{t\geq 0} \subset L((\mathcal{S}(\mathbb{R}^n))^m)$ if and only if $P(\partial/\partial x)$ satisfies the Petrovskiĭ correctness condition. Moreover, if it is the case, then $(S_t)_{t\geq 0}$ is an exponential semigroup whose characteristic exponent is equal to the stability index of $P(\partial/\partial x)$. Similar statements are also proved for some other function spaces on $\mathbb{R}^n$, and for the space of tempered distributions.

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Web link: ***www.IntellectualArchive.com/getfile.php?file=MvrwaCm211A&orig_file=Jan_Kisynski__The_Petrovskii_correctness.pdf***

ID #: 479 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 18, 2012

Author: **Gerd Niestegge**

Title: **Third-order interference and a principle of `quantumness`**

Abstract: Are there physical, probabilistic or information-theoretic principles which characterize the quantum probabilities and distinguish them from the classical case as well as from other probability theories, or which reveal why quantum mechanics requires its very special mathematical formalism? The paper identifies the fundamental absence of third-order interference as such a principle of `quantumness`. Considering three-slit experiments, the concept of third-order interference was originally introduced by Sorkin in 1994.

Web link: ***www.IntellectualArchive.com/getfile.php?file=bOG4oOFK1sw&orig_file=Gerd_Niestegge__Third-order_interference.pdf***

ID #: 480 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 18, 2012

Author: **Gerd Niestegge**

Title: **Three-slit experiments and nonlocality - The absence of 3rd-order interference implies**

Tsirelson`s bound

Abstract: In the EPR experiments, quantum mechanics exhibits stronger statistical correlations between two spatially separated physical systems than possible in the classical case. These nonlocal correlations are shown in a violation of the Bell or CHSH inequality, but still respect another bound discovered by Tsirelson. The paper reveals a link between Tsirelson`s bound and Sorkin`s concept of third-order interference. Considering multiple-slit experiments - not only the traditional configuration with two slits, but also configurations with three and more slits - Sorkin detected that third-order (and higher-order) interference is not possible in quantum mechanics. It now turns out that Tsirelson`s bound holds in almost any other probabilistic theory which rules out third-orderinterference.

Web link: ***www.IntellectualArchive.com/getfile.php?file=7lM8xJ2erlv&orig_file=Gerd_Niestegge__Nonlocal_correlations.pdf***

ID #: 481 **Natural Sciences / Mathematics / Algebra**

Submitted on: Jun 18, 2012

Author: **Christian Pierre**

Title: **GL(2)-structures of the Langlands global program**

Abstract: All kinds of global correspondences of Langlands are evaluated from the functional representation spaces of the algebraic bilinear semigroups GL2(.x.) with entries in products,right by left,of sets of archimedean increasing completions. Degenerate singularities on these functional representation spaces can give rise,by versal deformations and blowups of these,to one or two new covering functional representation spaces of GL2(.x.) according to the type of considered singularities. The discovered correspondences of Langlands are associated with singular and nonsingular universal GL(2)-structures.

Web link: ***www.IntellectualArchive.com/getfile.php?file=oQbOctJehik&orig_file=christian_pierre__GL2-structures.pdf***

ID #: 482 **Natural Sciences / Physics / Astrophysics**

Submitted on: Jun 18, 2012

Author: **Jacques Moret-Bailly**

Title: **Introduction of coherence in astrophysical spectroscopy**

Abstract: By confusing the radiance of a single mode light beam, constant in a transparent medium, with the irradiance which decreases away from the source, Menzel purports to show that coherent interactions of light with the diluted media of astrophysics, are negligible. Therefore, to study the interaction of light with gases, astrophysicists use Monte Carlo computations which work to study nuclear systems, but not optics: optical modes which may be defined in inhomogeneous media or for the emissions of single atoms interact coherently with these systems: a unique formula represents, according to the sign of a parameter, absorption and coherent emission. The optical and spectroscopic properties of a very simple model, an extremely hot source in an isotropic cloud of pure, low pressure, initially cold, huge hydrogen cloud are studied using Planck`s and Einstein`s theories.

Web link: ***www.IntellectualArchive.com/getfile.php?file=jdg2juXau7T&orig_file=Jacques_Moret-Bailly__Introduction_of_coherence.pdf***

ID #: 483 **Natural Sciences / Mathematics / Combinatorics**

Submitted on: Jun 18, 2012

Author: **I. Cahit**

Title: **A Victorian Age Proof of the Four Color Theorem**

Abstract: In this paper we have investigated some old issues concerning four color map problem. We have given a general method for constructing counter-examples to Kempe`s proof of the four color theorem and then show that all counterexamples can be rule out by re-constructing special 2-colored two paths decomposition in the form of a double-spiral chain of the maximal planar graph. In the second part of the paper we have given an algorithmic proof of the four color theorem which is based only on the coloring faces (regions) of a cubic planar maps. Our algorithmic proof has been given in three steps. The first two steps are the maximal mono-chromatic and then maximal dichromatic coloring of the faces in such a way that the resulting uncolored (white) regions of the incomplete two-colored map induce no odd-cycles so that in the (final) third step four coloring of the map has been obtained almost trivially.

Web link: ***www.IntellectualArchive.com/getfile.php?file=HgkQiqfOMwH&orig_file=I_Cahit__A_Victorian_***

Age_Proof.pdf

ID #: 484 **Natural Sciences / Mathematics / Combinatorics**

Submitted on: Jun 18, 2012

Author: **I. Cahit**

Title: **On the Three Colorability of Planar Graphs**

Abstract: The chromatic number of an planar graph is not greater than four and this is known by the famous four color theorem and is equal to two when the planar graph is bipartite. When the planar graph is even-triangulated or all cycles are greater than three we know by the Heawood and the Grotszch theorems that the chromatic number is three. There are many conjectures and partial results on three colorability of planar graphs when the graph has specific cycles lengths or cycles with three edges (triangles) have special distance distributions. In this paper we have given a new three colorability criteria for planar graphs that can be considered as an generalization of the Heawood and the Grotszch theorems with respect to the triangulation and cycles of length greater than 3. We have shown that an triangulated planar graph with disjoint holes is 3-colorable if and only if every hole satisfies the parity symmetric property, where a hole is a cycle (face boundary) of length greater than 3.

Web link: ***www.IntellectualArchive.com/getfile.php?file=JYgeLC1hVqJ&orig_file=I_Cahit__Three_Colorability_of_Planar_Graphs.pdf***

ID #: 485 **Natural Sciences / Mathematics / Combinatorics**

Submitted on: Jun 18, 2012

Author: **I. Cahit**

Title: **The proof of Steinberg`s three coloring conjecture**

Abstract: The well-known Steinberg`s conjecture asserts that any planar graph without 4- and 5-cycles is 3 colorable. In this note we have given a short algorithmic proof of this conjecture based on the spiral chains of planar graphs proposed in the proof of the four color theorem by the author in 2004.

Web link: ***www.IntellectualArchive.com/getfile.php?file=jtedFU552et&orig_file=I_Cahit__The_proof_of_Steinberg.pdf***

ID #: 486 **Natural Sciences / Mathematics / Combinatorics**

Submitted on: Jun 18, 2012

Author: **I. Cahit**

Title: **Algorithmic proof of Barnette`s Conjecture**

Abstract: In this paper we have given an algorithmic proof of an long standing Barnette`s conjecture (1969) that every 3-connected bipartite cubic planar graph is hamiltonian. Our method is quite different than the known approaches and it rely on the operation of opening disjoint chambers, bu using spiral-chain like movement of the outer-cycle elastic-sticky edges of the cubic planar graph. In fact we have shown that in hamiltonicity of Barnette graph a single-chamber or double-chamber with a bridge face is enough to transform the problem into finding specific hamiltonian path in the cubic bipartite graph reduced. In the last part of the paper we have demonstrated that, if the given cubic planar graph is non-hamiltonian then the algorithm which constructs spiral-chain (or double-spiral chain) like chamber shows that except one vertex there exists (n-1)-vertex cycle.

Web link: ***www.IntellectualArchive.com/getfile.php?file=fcfJaFFQpg2&orig_file=I_Cahit__Algorithmic_proof_of_Barnette.pdf***

ID #: 487 **Natural Sciences / Mathematics / Combinatorics**

Submitted on: Jun 18, 2012

Author: **I. Cahit**

Title: **A Unified Spiral Chain Coloring Algorithm for Planar Graphs**

Abstract: In this paper we have given a unified graph coloring algorithm for planar graphs. The problems that have been considered in this context respectively, are vertex, edge, total and entire colorings of the planar graphs. The main tool in the coloring algorithm is the use of spiral chain which has been used in the non-computer proof of the four color theorem in 2004. A more precies explanation of the proof of the four color theorem by spiral chain coloring is also given in this paper. Then we continue to

spiral-chain coloring solutions by giving the proof of other famous conjectures of Vizing`s total coloring and planar graph conjectures of maximum vertex degree six. We have also given the proof of a conjecture of Kronk and Mitchem that any plane graph of maximum degree "Delta" is entirely ("Delta"+4)-colorable.The last part of the paper deals with the three colorability of planar graphs under the spiral chain coloring. We have given an efficient and short proof of the Groetzsch`s Theorem that triangle-free planar graphs are 3-colorable.

Web link: ***www.IntellectualArchive.com/getfile.php?file=a0eCWakeGQ7&orig_file=I_Cahit__A_Unified_Spiral_Chain_Coloring_Algorithm.pdf***

ID #: 488 **Natural Sciences / Astronomy / Stellar astronomy**

Submitted on: Jun 19, 2012

Author: **Igor Yu. Potemine**

Title: **Transit of Luyten 726-8 within 1 ly from Epsilon Eridani**

Abstract: This is one of results from our program of massive simulations of close encounters for all nearby stars. Epsilon Eridani is an extremely interesting star having one confirmed planet and multiple asteroid and debris belts. It should have a quite massive Oort cloud as well. Deltorn et al. searched for past Nemesis encounters of epsilon Eri. In this paper we show that, according to current astrometric data, an other famous nearby star Luyten 726-8AB (=BL/UV Ceti) will pass at <~= 0.93 ly from Epsilon Eridani in ~ 31.5 kyr. So, it will probably pierce through the outer part of the hypothetical Oort cloud of Epsilon Eri. BL/UV Ceti has only about 20 percent of the solar mass. Nevertheless, it could influence directly some long-period comets of Epsilon Eridani. The duration of mutual transit of two star systems within 1 ly from each other is >~ 4.6 kyr. Our simulations show that stellar encounters within 1 ly might be more frequent than previously thought.

Web link: ***www.IntellectualArchive.com/getfile.php?file=gFNxHoDjKrO&orig_file=Igor_Potemine__Transit_of_Luyten.pdf***

ID #: 489 **Natural Sciences / Astronomy / Stellar astronomy**

Submitted on: Jun 19, 2012

Author: **Igor Yu. Potemine**

Title: **Giant Nemesis candidate HD 107914 / HIP 60503 for the perforation of Oort cloud**

Abstract: So far, GJ 710 is the only known star supposed to pass through outskirts of the solar system within 1 ly. We have reexamined the SIMBAD database for additional stellar candidates (from highest ratios of squared parallax to total proper motion) and compared them with new HIP2 parallaxes and known radial velocities. At the moment, the best nominee is double star HD 107914 in the constellation Centaurus at ~ 78.3 pc from the Sun whose principal component is a white (A-type) giant. It does not seem to appear neither in general catalogues of radial velocities available at SIMBAD nor in authoritative Garcia-Sanchez et al. papers on stellar encounters with the solar system. A very accurate value of its total proper motion is also extremely important. In the case of Vr=-100 km/s and most "advantageous" HIP2 data, HD 107914 could pass as near as 8380 AU from the Sun in an almost direct collision course with the inner part of the solar system!

Web link: ***www.IntellectualArchive.com/getfile.php?file=48NFrl7Kx4N&orig_file=Igor_Potemine__Giant_Nemesis_candidate.pdf***

ID #: 491 **Natural Sciences / Computer Sciences / Analysis of algorithms**

Submitted on: Jun 20, 2012

Author: **Eric Filiol**

Title: **PERSEUS Technology: New Trends in Information and Communication Security**

Abstract: Using cryptography to protect information and communication has bacically two major drawbacks. First, the specific entropy profile of encrypted data makes their detection very easy. Second, the use of cryptography can be more or less regulated, not to say forbidden, according to the countries. If the right to freely protect our personal and private data is a fundamental right, it must not hinder the action of Nation States with respect to National security. Allowing encryption to citizens holds for bad guys as well. In this paper we propose a new approach in information and communication security that may solve all these issues, thus representing a rather interesting trade-off between apparently opposite security needs. We introduce the concept of scalable security based on computationnally hard problem of coding theory with the PERSEUS technology. The core idea is to encode date with variable punctured convolutional codes in such a way that any cryptanalytic attempt will require a time-consuming encoder reconstruction in order to decode.

Web link: ***www.IntellectualArchive.com/getfile.php?file=wHWOv8FqqeS&orig_file=Eric_Filiol__PERSEUS_Technology.pdf***

ID #: 493 **Natural Sciences / Computer Sciences / Mathematical logic**

Submitted on: Jun 21, 2012

Author: **Zoran Majkic**

Title: **Reduction of Many-valued into Two-valued Modal Logics**

Abstract: In this paper we develop a 2-valued reduction of many-valued logics, into 2-valued multi-modal logics. Such an approach is based on the contextualization of many-valued logics with the introduction of higher-order Herbrand interpretation types, where we explicitly introduce the coexistence of a set of algebraic truth values of original many-valued logic, transformed as parameters (or possible worlds), and the set of classic two logic values. This approach is close to the approach used in annotated logics, but offers the possibility of using the standard semantics based on Herbrand interpretations. Moreover, it uses the properties of the higher-order Herbrand types, as their fundamental nature is based on autoreferential Kripke semantics where the possible worlds are algebraic truth-values of original many-valued logic. This autoreferential Kripke semantics, which has the possibility of flattening higher-order Herbrand interpretations into ordinary 2-valued Herbrand interpretations, gives us a clearer insight into the relationship between many-valued and 2-valued multi-modal logics. This methodology is applied to the class of many-valued Logic Programs, where reduction is done in a structural way, based on the logic structure (logic connectives) of original many-valued logics. Following this, we generalize the reduction to general structural many-valued logics, in an abstract way, based on Suszko`s informal non-constructive idea. In all cases, by using developed 2-valued reductions we obtain a kind of non truth-valued modal meta-logics, where two-valued formulae are modal sentences obtained by application of particular modal operators to original many-valued formulae.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Oe1EKgeKhwg&orig_file=MultiModalLNCS.pdf***

ID #: 494 **Natural Sciences / Other / Trans-Disciplinarian**

Submitted on: Jun 21, 2012

Author: **Shubham Chakraborty**

Title: **Use of Python and Phoenix-M Interface in Robotics**

Abstract: In this paper I will show how to use Python programming with a computer interface such as Phoenix-M 1 to drive simple robots. In my quest towards Artificial Intelligence(AI) I am experimenting with a lot of different possibilities in Robotics. This one will try to mimic the working of a simple insectâ€™s nervous system using hard wiring and some minimal software usage. This is the precursor to
my advanced robotics and AI integration where I plan to use a new paradigm of AI based on Machine Learning and Self Consciouness via Knowledge Feedback and Update Process.

Web link: ***www.IntellectualArchive.com/getfile.php?file=JL57PN5LITX&orig_file=phoenix-m-research.pdf***

ID #: 495 **Natural Sciences / Physics / Philosophy of Physics**

Submitted on: Jun 22, 2012

Author: **Tadashi FUJIMOTO**

Title: **Time representation on the Beginning of space-time -- From a philosophical and mathematical view**

Abstract: I would like to consider the Beginning of space-time in this paper. First of all, we do consideration historical thought. A lot of philosophers have considered the relation between this real phenomenal world and the basic world in which the

phenomenal world is grounded. We will glimpse thought historical details about such respect. Afterwards, we interpret the representation of space-time on Quantum theory and Relativistic theory. In this case, we will take recent results of time operator theory into consideration.

Web link: ***www.IntellectualArchive.com/getfile.php?file=CM6jlne1MKe&orig_file=gensi1103.pdf***

ID #: 496 **Natural Sciences / Computer Sciences / Network topology**

Submitted on: Jun 24, 2012

Author: **Md. Monzur Morshed, Meftah Ur Rahman, Md. Rafiqul Islam**

Title: **An Empirical Study of UDP (CBR) Packet Performance over AODV Single & Multi-Channel Parallel Transmission in MANET**

Abstract: Mobile Ad-hoc Network is a temporary network which is the cooperative engagement of a collection of standalone mobile nodes that are not connected to any external network. It is a decentralized network where mobile nodes can be easily deployed in almost any environment without sophisticated infrastructure support. An empirical study has been done for AODV routing protocol under single channel and multi channel environment using the tool NS2. To compare the performance of AODV in the two environments, the simulation results have been analyzed by graphical manner and trace file based on QoS metrics such as throughput, packet drop, delay and jitter. The simulation result analysis verifies the AODV routing protocol performances for single channel and multi channel. After the analysis of the simulation scenario we suggest that use of Parallel MAC (PMAC) may enhance the performance for multi channel.

Web link: ***www.IntellectualArchive.com/getfile.php?file=h1mfkj2wLME&orig_file=Monzur_Morshed_An_Empirical_Study_of_UDP_CBR_Packet .pdf***

ID #: 497 **Natural Sciences / Computer Sciences / Object-oriented programming**

Submitted on: Jun 24, 2012

Author: **Md. Monzur Morshed, Md. Arifur Rahman, Salah Uddin Ahmed**

Title: **A Literature Review of Code Clone Analysis to Improve Software Maintenance Process**

Abstract: Software systems are getting more complex as the system grows where maintaining such system is a primary concern for the industry. Code clone is one of the factors making software maintenance more difficult. It is a process of replicating code blocks by copy-and-paste that is common in software development. In the beginning stage of the project, developers find it easy and time consuming though it has crucial drawbacks in the long run. There are two types of researchers where some researchers think clones lead to additional changes during maintenance phase, in later stage increase the overall maintenance effort. On the other hand, some researchers think that cloned codes are more stable than non cloned codes. In this study, we discussed Code Clones and different ideas, methods,clone detection tools, related research on code clone, case study.

Web link: ***www.IntellectualArchive.com/getfile.php?file=iTXHM2OQbg1&orig_file=Monzur_Morshed_A_Literature_Review_of_Code_Clone_Analysis.pdf***

ID #: 498 **Social Sciences / Economics / Financial**

Submitted on: Jun 24, 2012

Author: **Takashi Kato**

Title: **Theoretical Sensitivity Analysis for Quantitative Operational Risk Management**

Abstract: We study the asymptotic behaviour of the difference between the Value at Risks VaR(L) and VaR(L + S) for heavy tailed random variables L and S with alpha ^ 1 as an application to the sensitivity analysis of quantitative operational risk management in the framework of an advanced measurement approach (AMA) of Basel II. Here the variable L describes the loss amount of the present risk profile and S means the loss amount caused by an additional loss factor. We have different types of results according to the magnitude of the relationship of the thicknesses of the tails of L and S. Especially if the tail of S is sufficiently thinner than that of L, then the difference between prior and posterior risk amounts VaR(L + S) - VaR(L) is asymptotically equivalent to the component VaR of S (which is equal to the expected loss of S when L and S are independent).

Web link: ***www.IntellectualArchive.com/getfile.php?file=m7ComZkrms0&orig_file=ope_sensitivity_IA.pdf***

ID #: 499 **Social Sciences / Economics / Financial**

Submitted on: Jun 24, 2012

Author: **Takashi Kato**

Title: **Stock Price Fluctuations in an Agent-Based Model with Market Liquidity**

Abstract: We study an agent-based stock market model with heterogeneous agents and friction. Our model is based on that of Foellmer-Schweizer(1993) the process of a stock price in a discrete-time framework is determined by temporary equilibria via agents` excess demand functions, and the diffusion approximation approach is applied to characterize the continuous-time limit (as transaction intervals shorten) as a solution of the corresponding stochastic differential equation (SDE). In this paper we further make the assumption that some of the agents are bound by either short sale constraints or budget constraints. Then we show that the continuous-time process of the stock price can be derived from a certain SDE with oblique reflection. Moreover we find that the short sale (respectively, budget) constraint causes overpricing (respectively, underpricing).

Web link: ***www.IntellectualArchive.com/getfile.php?file=pWJkGDXjOwQ&orig_file=equi_liq_IA.pdf***

ID #: 500 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Jun 25, 2012

Author: **Piero Chiarelli**

Title: **Is the quantum hydrodynamic analogy more general than the Schrödinger approach?**

Abstract: The quantum hydrodynamic analogy (QHA) equivalent to the Schrodinger equation is investigated and extended to the stochastic case. The investigation shows that in addition to reproducing the standard quantum mechanics the QHA model is able to generally describe the quantum stochastic dynamics leading to the dissipative Schrodinger equation given by Kostin [55] as a particular case. The inspection shows that the QHA is well suited for the treatment of problems where local noise (spatially distributed one) is introduced. In this case the analysis shows that the bi-univocal correspondence between the QHA and the Schrodinger approach breaks down and that the states described by the QHA do not have their corresponding ones into the Schrodinger description.

Web link: ***www.IntellectualArchive.com/getfile.php?file=X6pwOlgNJ16&orig_file=The QHA as deterministic limit of a SDE.pdf***

ID #: 501 **Natural Sciences / Mathematics / Algebra**

Submitted on: Jun 25, 2012

Author: **V.I.Chilin and G.B.Levitina**

Title: **Derivations on ideals in commutative AW^*-algebras**

Abstract: Let $\mathcal{A}$ be a commutative AW^*-algebra, let $S(\mathcal{A})$ be the $*$-algebra of all measurable operators affiliated with $\mathcal{A}$, let $\mathcal{I}$ be an ideal in $\mathcal{A}$, let $s(\mathcal{I})$ be the support of the ideal $\mathcal{I}$ and let $\mathbb{Y}$ be a quasi-normed solid subspace in $S(\mathcal{A})$. We show that any derivation from $\mathcal{I}$ into $\mathbb{Y}$ is always trivial. At the same time, there exist non-zero derivations from $\mathcal{I}$ into $S(\mathcal{A})$, if and only if the Boolean algebra of all projections from $s(\mathcal{I})\mathcal{A}$ is not σ-distributive.

Web link: ***www.IntellectualArchive.com/getfile.php?file=cNWFMikqCWh&orig_file=translate_AW-algebras.pdf***

ID #: 517 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Jun 25, 2012

Author: **Stanislav Zub**

Title: **Research into Orbital Motion Stability in System of Two Magnetically Interacting Bodies**

Abstract: The stability of the orbital motion of two long cylindrical magnets interacting exclusively with magnetic forces is described. To carry out analytical studies a model of magnetically interacting symmetric tops is used. The model was previously developed within the quasi-stationary approach for an electromagnetic field based on the general expression of the energy of interacting magnetic bodies. A special role in the investigation of the stability of orbital motions is played by the so-called relative equilibria, i.e. the trajectories of the system dynamics which are at the same time one-parameter subgroups of the system invariance group. Nowadays their stability is normally investigated using two similar approaches -- energy-momentum and energy-Casimir methods. The most suitable criterion for the system stability investigation was formulated in the theorem of this stability criterion

successfully generalizes both the methods mentioned above and covers the Hamiltonian formalism based on Poisson structures.

Web link: ***www.IntellectualArchive.com/getfile.php?file=fKieBXgUJns&orig_file=Stanislav_Zub__Orbital_Motion_Stability.pdf***

ID #: 502 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Jun 26, 2012

Author: **N. D. Vagshette, P. K. Pawar, M. K. Patil**

Title: **Ultraluminous X-ray sources in dusty early-type galaxies**

Abstract: We present properties of 34 ULX sources detected within D$_{25}$ region of 15 dusty early-type galaxies. All these sources have X-ray luminosity greater than 10^{39} \lum, implying that they are resulted due to the accretion of matter on to compact object with mass $\ge$ 10\Msun\,. Spectra of X-ray photons extracted from individual ULX are well represented by an absorbed power law with photon indices lying between 0.81 to 2.64, with their spectral properties closely matching with the hard-state spectra of the Galactic black hole binaries. The combined XLF of all the 34 ULXs is consistent with that reported earlier for early-type galaxies and is adequately described by a power-law with slope equal to -1.34\pms0.12. The X-ray color-color plot of ULXs exhibit significant difference of their spectral properties with X-ray colors lying in the range between (-0.5, -0.5) to (+1.0, +1.0). We have quantified mass of a accreting sources on the basis of measured values of X-ray luminosities of individual ULXs and found to lie in the range between 20 \Msun\, $\lesssim$ {\bf M} $\lesssim$ 100 \Msun.

Web link: ***www.IntellectualArchive.com/getfile.php?file=fkWo2ScWUDS&orig_file=ulx_ass.pdf***

ID #: 503 **Natural Sciences / Physics / Econophysics**

Submitted on: Jun 26, 2012

Author: **V.Volov**

Title: **Fractal-Cluster Theory of Resource Distribution in Socio-Economic Systems**

Abstract: Abstract
The fundamentals of fractal-cluster theory (determined part), including fractal-cluster correlation (FCC), the dynamic equations of the fractal-cluster system evolution and the criteria for the complex systems management are presented. The analysis of economic systems management is performed on the basis of the synthesis of I.Prigogine's thermodynamics of structure foundations and fractal-cluster correlation.
The article shows the correlation between the fractal-cluster and the traditional economic analysis for economic systems. The singularity of the fractal-cluster theory lies in the possibility to optimize the budget distribution under undetermined conditions and to predict possible crisis tendencies in the economic system development in advance.
The purpose of the given research is to work out the analytical apparatus for sustained resource distribution analysis of a complex self-organizing system, which is based on I.Prigogine's thermodynamics structure and V.P Burdakov's fractal-cluster correlations. The optimization of resource distribution is especially important for such socio-economic systems as fundamental science, education, social sphere; as well as for industrial system at micro-, mezo- and macrolevels. The information about the cost of a thing produced in such systems is insufficient. Due to this fact, V. Leontief's classical models of input-output balance (static and dynamic) do not work.
The analysis confirmed that the most efficient management of resource distribution is carried out by the Fibonacci sequence with the help of the new mathematical apparatus based on the Golden Section [A.Stakhov, 2005-2006]. The theory that has been developed represents in a certain sense a compromise between H. Haken's and I. Prigogine's approaches to the analysis of complex self-organized systems which are far from equilibrium.

Web link: ***www.IntellectualArchive.com/getfile.php?file=MGKWNoLIFf9&orig_file=Article.doc***

ID #: 504 **Philosophy / Logic / Formalism**

Submitted on: Jun 26, 2012

Author: **Giuseppe Raguní**

Title: **The Gödel's legacy: revisiting the Logic**

Abstract: Some common fallacies about fundamental themes of Logic are exposed:
the First and Second incompleteness Theorem interpretations, Chaitin's various

superficialities and the usual classification of the axiomatic Theories in function of its language order.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ce0BVEoLAu0&orig_file=the GÃ¶del's legacy.pdf***

ID #: 507 **Natural Sciences / Physics / Particle physics**

Submitted on: Jun 29, 2012

Author: **C. S. Unnikrishnan**

Title: **One Good Reason Why Not The Higgs**

Abstract: This is a sceptical appreciation of the Higgs solution for providing mass to the fundamental particles within the gauge theory description in the standard model. My reasoned scepticism about the success of the Higgs search at LHC and elsewhere is based on my conviction that the standard model that does not include gravity will not reveal the origin of the charge of gravity. The essential point is that interaction-induced inertia is not the same as the charge of gravity and to qualify as mass it has to play the dual role of inertia and the gravitational charge. The final picture should respect the equivalence principle, at least approximately. Some imperfect analogy with another context of effective mass of the dressed electron in condensed matter is pointed out to support the scepticism.

Web link: ***www.IntellectualArchive.com/getfile.php?file=WPjv56eAKN8&orig_file=higgs_gravity.pdf***

ID #: 516 **Natural Sciences / Physics / Relativity**

Submitted on: Jun 29, 2012

Author: **John C. Hodge**

Title: **Comments on "The Pioneer Anomaly in the Light of New Data"**

Abstract: Turyshev, S.G., Toth, V.T., 2009. reported on the status of the analysis of recently recovered Pioneer 10 (P10) and Pioneer 11 (P11) flight data and commented on some, but not all, of the characteristics of the Pioneer Anomaly (PA) that must be explained by a candidate model. Only one model presented to date is consistent with all the characteristics.

Web link: ***www.IntellectualArchive.com/getfile.php?file=aMSBMi11LSL&orig_file=John_Hodge__The_Pioneer_Anomaly.pdf***

ID #: 508 **Natural Sciences / Mathematics / Differential equations**

Submitted on: Jun 30, 2012

Author: **Vieri Benci**

Title: **Ultrafunctions and generalized solutions**

Abstract: The theory of distributions provides generalized solutions for problems which do not have a classical solution. However, there are problems which do not have solutions, not even in the space of distributions. As model problem you may think of

$$-\triangle u = u^{p-1}\ ,\ u > 0,\ p \geq \frac{2N}{N-2}$$

with Dirichlet boundary conditions in a bounded open star-shaped set. Having this problem in mind, we construct a new class of functions called ultrafunctions in which the above problem has a (generalized) solution. In this construction, we apply the general ideas of Non Archimedean Mathematics (NAM) and some techniques of Non Standard Analysis. Also, some possible applications of ultrafunctions are discussed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=jFKgeiaV9Hq&orig_file=ULTRAFUNCTIONS_48.pdf***

End of June 2012 bulletin