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The Linux and Virtual Learning Environments Workshop Project

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Abstract: The paper presents our results concerning dissemination of the Free and Libre Open Source Software (FLOSS) in Romanian Educational System. The attempt to use of FLOSS in education, and especially for eLearning is not new, and it is denotted by FLOSSE. Beginning from successful foreign FLOSSE models like K12LTSP, SkoleLinux, Edubuntu projects or SchoolForge and FOSSE-POSSE portals, it was organized an workshop, called "Linux and Virtual Learning Environments" (LVLE). Since 2003, it took place for the sixth time in Arad, Romania. The immediate goal of this conference is to gain the interest for the FLOSS world. The participants were Romanian teachers and students. Since 2006 a satellite IT contest for student teams was introduced, with a closed topic. The present paper describe the results of our experiment: a conference for young students and teachers, were the number of students was at least equal with number of teachers. The main purpose of our activity was to build a team, and a virtual community, of young and enthusiast professionals, working hard for FLOSSE development, dissemination, and localization.

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Increasing the Performance of the ENT Randomness Test Suite

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Abstract: In the context of ever increasing need for good quality random number sequences, assessing the quality of randomness sources becomes a crucial task. The main assessment methods in use are the statistical randomness tests. No finite number of tests, though, can guarantee randomness. However, using various tests, that assess the sequence from several different perspectives, can increase our confidence in the randomness of the sequence. Sadly, many statistical tests are poorly implemented, introducing various limitations and making the assessment process very time consuming. We present an enhancement of the well known ENT randomness test suite, showing how a few improvement steps in the implementation can increase the performance of the original test suite more than ten times.

Key Words: entropy, statistical testing, random number sequences

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Benchmarking the True Random Number Generator of a TPM

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Abstract: A TPM (trusted platform module) is a chip present mostly on newer motherboards, and its primary function is to create, store and work with cryptographic keys. This dedicated chip can serve to authenticate other devices or to protect encryption keys used by various software applications. Among other features, it comes with a true random number generator that can be used for cryptographic purposes. This random number generator consists of a state machine that mixes unpredictable data with the output of a one way hash function (SHA-1). According the specification it can be a good source of unpredictable random numbers even without having to require a genuine source of hardware entropy. However the specification recommends collecting entropy from any internal sources available such as clock jitter or thermal noise in the chip itself, a feature that was implemented by most manufacturers. This paper will benchmark the random number generator of a TPM chip from two perspectives: the quality of the random bit sequences generated, as well as the output bit rate.

Key Words: benchmarking, TPM, TRNG, statistical testing

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Bivariate Operators of Binomial Type

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Abstract: In this paper we consider some bivariate operators of binomial type. We study the convergence of these operators and give the estimations for the rate of convergence.

Key Words: linear and positive operator, bivariate operators, rate of convergence

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Generalized Convexity and Simultaneous Approximation

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Abstract: In this paper it is established a relationship between a notion of generalized convexity and the approximation process of a sequence of linear operators towards certain differential operator. The operators are assumed to preserve the sign of this differential operator and this fact is used to characterize those functions which present an optimal degree of convergence for this process.

Key Words: generalized convexity, simultaneous approximation, saturation

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Entropy Analysis for a Mixed Convection Flow in an Inclined Channel: Downward Case

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Abstract: The issue of entropy generation in an inclined channel filled with a porous medium is studied. The flow is considered downward and the heat flux is into the channel. The entropy generation number is calculated by using the obtained velocities and temperature distributions from the computer code. The results are presented for different governing parameters including Rayleigh number and inclination angle of the channel.

Key Words: convection, porous medium, analytical solutions, entropy generation

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Approximation Properties of a Modified Jakimovski-Leviatan Operator

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Abstract: We consider a modified Jakimovski-Leviatan operator in exponential weighted space of function of one variable. We study the degree of approximation of a function by the considered sequence of operators and we prove that the operator has convexity preserving properties.

Key Words: Modified Szas-Mirakjan operators, exponential weight

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Complementariness with Respect to the Identric Mean

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Abstract: The mean N is called the **complementary** of the mean M with respect to P if $P(M, N) = P$. Many complementaries were obtained by series expansion of the involved means. For this, some Euler's formula was used. Here we consider the direct method, namely step by step differentiation, useful when other methods cannot be applied. With this method we try to determine the complementary of some means with respect to the identric mean.

Key Words: Greek means, Identric mean, complementary mean.

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Pareto Solutions for a Multiobjective Optimization Problem

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Abstract: For a multiobjective optimization problem we investigate the (weakly) efficient solutions and their relationships in the objective space. When some of the weakly efficient solutions are known, we propose a method to obtain other new weakly efficient solutions in the objective space.

Key Words: Multiobjective optimization, efficient solution, weakly efficient solution, solutions structure.

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Orthogonal Projectors and the Best Linear Unbiased Estimators in the Gauss-Markov Model

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Abstract: It is well known that in the Gauss-Markov model $(\mathbf{Y}, \mathbf{X}\beta, \sigma^2\mathbf{I}_n)$, the BLUS (the best unbiased estimator) of $\mathbf{X}\beta$ is $\widehat{\mathbf{Y}}$, the orthogonal projection of $\mathbf{Y}$ on $\mathcal{M}(\mathbf{X})-$the space spanned by the columns of matrix $\mathbf{X}$. The object of the present paper is to express some properties of the OLS estimator using the projection matrices and their properties.

Key Words: Econometrics, regression model, regressand, regressors, linear model, ordinary least squares, OLS estimator, projections matrices.

MSC 2000: 62H10, 62H12, 62J05, 94A17.

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Pointedness of the Friction Cone in Rigid-body Simulation

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Abstract: The present work describes the importance of the pointedness property in rigid body simulation. The paper is a brief overview of how this property was used in some rigid-body time-stepping schemes.

Key Words: rigid body systems, Coulomb friction, complementarity problems.

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An Inequality for Convex Functions of Third Order

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Abstract: Using a Popoviciu's theorem we generalize a result obtained by M. Anwar, J. Pečarić in [1] and S. Simič [4].

Key Words: linear functionals, Jensen's inequality, P_n-simple functionals

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Logic Type Functions in the Torsion Problem of "L" Shape Cut Bar

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Abstract: Using the logic type functions in the forming of the equations of some plane boundaries domains, it is formulated mathematically the solution of the partial derivative equation with boundary conditions. The paper concerns in the exemplification of this method in the case of the torsion of "L"- section - bar. The possibility of analytical expression of the complex form boundaries, suggest also large perspectives to use this method in many technical problems.

Key Words: logic type functions

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A Note on the Stirling Formula

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Abstract: This work is simply an improved proof of Stirling's Formula.

Key Words: Stirling's Formula, Wallis's Formula.

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The Noise Operator on Time Series Metric Spaces

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Abstract: A method is presented for extracting characteristic patterns from a time series using its representation by a symbolic time series. A procedure of adding a specific noise to the original time series is applied. The class of distorted symbolic time series is used to infer a probabilistic grammar. In the paper the conditions imposed to the noise are investigated in order to get a class of new series sufficiently closed to the original template. The method is applied on a real non-stationary time series: the exchange rate Romanian LEU/US$, 1991-2007.

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On some Inequalities for Picard Operators and Applications

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Abstract: This paper presents certain inequalities which are based on operatorial inequalities for Picard operators (Lungu, [4], [5]), (Lungu, Rus [6]), (Rus [9]-[12]). We present also their applications to hyperbolic differential inequalities.

Key Words: operatorial inequalities, Picard operators, Gronwall Lemmas, L-spaces, Riemann function

MSC 2000: 34A40, 35B05, 35R10, 47J20

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Some Properties of Semi-E-d-convex Functions

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Abstract: We introduce semi-E-d-convex functions and semi-E-d-quasiconvex functions, starting from d-convex functions introduced by P. Soltan and from semi-E-convex functions introduced by X. Chen. We study some properties of them.

Key Words: semi-E-d-convex functions, semi-E-d-quasiconvex functions

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The Modified Gamma Approximating Operators

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Abstract: By using the gamma distribution we shall define the modified gamma transform $\Gamma_{\alpha,\beta}^{(a,b)}$, $a, b \in \mathbb{R}$ from which we obtain as special cases both the modified gamma operators of the first and second kind. We obtain a several positive linear operators, as special cases of this gamma operators.

Key Words: Euler's Gamma distribution, Gamma transform, positive linear operators

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Approximation Operators Generated by Appell Polynomials

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Abstract: In this paper we construct positive linear operators using the generating functions of some Appell polynomials. Quantitative estimates are given using the first and the second moduli of continuity.

Key Words: Appell sequences, generating functions, positive linear operators, moduli of continuity

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Chained and Branched Net Nomograms for Functions of Several Variables

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Abstract: The present paper deals with the conditions by which a function of several variables, and also equations which have such functions as elements, can be represented by superpositions of functions of fewer variables. We will give the corresponding nomograms, by which these functions are nomographically represented. We will also build compound chained net nomograms or compound branched net nomograms for these functions.

Key Words: nomogram, function with superposition

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Discrete Best Approximation Polynomials in the Theory of Deformable Models

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Abstract: After defining the notion of deformable surface we shall develop a 2D reconstruction method of plane curves by using discrete best-approximation polynomials.

Key Words: deformable model, discrete best approximation, approximation error, superdense set

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Step Method for a Functional-differential Equation

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Abstract: We use the step method to obtain existence results for the solution of a functional-differential equation with both delay and linear modification of the arguments

Key Words: step method, Picard operators, weakly Picard operators, functional-differential equations

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Characterization of Functions with Restricted Linear Difference and Restricted Jensen Difference

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Abstract: In this paper we give a characterization of functions whose linear difference and Jensen difference belong to a linear subspace.

Key Words: Jensen functional equation, linear difference, linear transformation

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On the Stability of the Discrete Gamma Functional Equation

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Abstract: We prove that the discrete gamma functional equation in locally convex spaces is stable in Hyers-Ulam sense.

Key Words: gamma functional equation, stability

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Properties of Shepard's Operator – a Summing Up

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Abstract: This is a survey with explicit arguments of the most important properties and characteristics of Shepard's operator for the multi-dimensional case with arbitrary metric. We study the local behavior of the Shepard interpolants in the neighborhood of the interpolation nodes, with new results. Furthermore, we analyze and compare the advantages and the disadvantages of the original Shepard method in the context of scattered data interpolation problem.

Key Words: Shepard interpolation; scattered data interpolation; Shepard's operator.

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Some Regularities for Parametric Vector Equilibrium Problems

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Abstract: By using the vector topological pseudomonotonicity and Mosco convergence we give sufficient conditions for closedness of the solution map and we examine the Hadamard well-posedness of parametric vector equilibrium problem.

Key Words: parametric vector equilibrium problem, vector topological pseudomonotonicity, Mosco convergence, generalized Hadamard well-posedness

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Some Weighted Geometric Means

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Abstract: It is well known the weighted geometric mean obtained as limit of weighted power means. We analyze here three other weighted variants of the geometric mean: as algebraic mean, as Greek mean, and as Lehmer mean.

Key Words: Greek means, weighted geometric mean, Gini mean, Lehmer mean

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On Generalized Homogeneous Differential Equation

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Abstract: We study differential equations of type

$$F\left(x^{\alpha}y, x^{\alpha+1}\frac{dy}{dx}, ..., x^{\alpha+n}\frac{d^ny}{dx^n}\right) = 0, \alpha \in \mathrm{R}.$$

Key Words: homogeneous differential equation

MSC 2000: 34A05

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