

In this issue

Research Article

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[On -fractional variational calculus](#)

Published On: March 01, 2023 | Pages: 036 - 040

Author(s): KA Lazopoulos and AK Lazopoulos*

Pointing out that -fractional analysis is the unique fractional calculus theory including mathematically acceptable fractional derivatives, variational calculus for -fractional analysis is established. Since -fractional analysis is a non-local procedure, global extremals are only accepted. That means the extremals should satisfy not only the Euler–Lagrange equation ...

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[Experimental and theoretical studies of the influence of the bench elements on the transient operation of the turbine](#)

Published On: February 22, 2023 | Pages: 029 - 035

Author(s): AF Salnikov, SV Bochkarev and IA Zubko*

The energy parameters obtained during the tests of turbines of power units on the stand differ from those in the product. The research data, which results are presented in the materials of the paper, are aimed at analyzing the discrepancies between the parametric indicators of power units and bench tests of the turbines. The novelty of the obtained results reveals the ...

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[Spectral analysis of the Sturm-Liouville operator given on a system of segments](#)

Published On: February 07, 2023 | Pages: 012 - 020

Author(s): Snizhana Vovchuk*

The spectral analysis of the Sturm-Liouville operator defined on a finite segment is the subject of an extensive literature [1,2]. Sturm-Liouville operators on a finite segment are well studied and have numerous applications [1-6]. The study of such operators already given on the system segments (graphs) was received in the works [7,8]. This work is devoted to the stu ...

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[Two methods for determining combinatorial identities](#)

Published On: January 10, 2023 | Pages: 007 - 011

Author(s): Victor Kowalenko*

Two methods are presented for determining advanced combinatorial identities. The first is based on extending the original identity so that it can be expressed in terms of hypergeometric functions whereupon tabulated values of the functions can be used to reduce the identity to a simpler form. The second is a computer method based on Koepf's version of the Wilf-Zeilber ...

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Short Communication

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[Calculation of the magnetic field of the asteroid 4 Vesta parent body \(Application of SK theory\)](#)

Published On: February 18, 2023 | Pages: 026 - 028

Author(s): Violeta N Nikoli*

The SK theory provides a deeper insight into the magnetic properties of celestial bodies. In this study, the magnetic field calculated of the parent body of asteroid 4 Vesta, could facilitate deeper insight into the formation of planets or the Universe. ...

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[About the connection of the electron binding energy of a single carbon anion with binding energies of an electron attached to carbon molecules](#)

Published On: January 09, 2023 | Pages: 004 - 006

Author(s): AS Baltenkov and I Woiciechowski*

We demonstrate that the model of zero-range potentials can be successfully employed for the description of attached electrons in atomic and molecular anions, for example, negatively charged carbon clusters. To illustrate the capability of the model we calculate the energies of the attached electron for the family of carbon cluster anions consisting of two-, three- (eq ...

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[Boundary value problem for the third-order equation with multiple characteristics](#)

Published On: January 06, 2023 | Pages: 001 - 003

Author(s): Djumaniyazova Khilola Atamuratovna and Khashimov Abdukomil Risbekovich*

The article constructs a unique solution to a tertiary-order equation with multiple characteristics with boundary conditions that include all possible local boundary conditions. The uniqueness of the solution of boundary value problems is proved by the method of integral equations using the sign-definiteness of quadratic forms. When proving the existence of a solution ...

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Mini Review

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[A remark on a perturbed Benjamin-Bona-Mahony type equation and its complete integrability](#)

Published On: February 14, 2023 | Pages: 021 - 025

Author(s): Myroslava I Vovk, Petro Ya Pukach and Anatolij K Prykarpatski*

In the Letter, we study a perturbed Benjamin-Bona-Mahony nonlinear equation, which was derived for describing shallow water waves and possessing a rich Lie symmetry structure. Based on the gradient-holonomic integrability checking

scheme applied to this equation, we have analytically constructed its infinite hierarchy of conservation laws, derived two compatible Poiss ...

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[DOI: 10.17352/amp.000071](#)