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Mathematics

REGARDING THE GENERAL CHARACTER OF THE POLIGONAL TRIGONOMETRY

Malvina BAICA and Mircea CÂRDU

Abstract. In this paper, we will demonstrate the general character of the polygonal trigonometry (PT) whose fundamental elements are valid for both the case of quadratic trigonometry (QT) and the case of classical trigonometry (CT).

QT is the particular case of the PT and the lower limit of the number of sides n of trigonometric polygon (n=4), and CT is the particular case of PT situated at the upper limit of the value n, thus n= ∞.

Keywords: quadratic trigonometry (QT), the polygonal trigonometry, classical trigonometry (CT)**.**

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EXISTENCE AND UNIQUENESS OF THE SOLUTION FOR THE CUBIC FUNCTIONAL EQUATION

Nicolae N. NEAMȚU

Abstract. The inspiration for this paper was caught by the cubic functional equation, which was discussed by J.M.Rassias [3] and P.Găvruță and L.Cădariu [2]. The goal of this paper is to prove the existence and uniqueness of the solution to the cubic functional equation and to actually determine it.

Keywords: cubic functional equation

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CONHARMONIC TRANSFORMATIONS IN GENERALIZED WEYL SPACES

Hakan DEMIRBÜKER and Leyla Zeren ARGÜN

Abstract. In this paper, we have studied conformal transformations preserving harmonic functions (Conharmonic transformations) in generalized Weyl spaces.

Keywords: harmonic functions.

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SUR LES ZEROS DES SERIES DE PUISSANCE (V)

Gheorghe Marin TUDOR

Résumé. Dans cet ouvrage, nous allons continuer l'étude sur la localisation des zéros des séries de puissances. Dans les ouvrages [1], [2], le problème essentiel réside, en essence, dans le fait qu'on détermine effectivement, une limite inférieure pour les modules des zéros de séries de puissances.

Dans cette note, il est question de donner une amelioration des résultats signalés ci-dessus.

Keywords: zéros des séries.

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Physics

SURFACE ELECTRON STATES OF THIN METALLIC FILMS

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Abstract. Surface electron states of thin metallic films was analyzed using Green's function method. We have calculated diagonal components of free-electron Green's functions which enabled the complete insight into the electron spectra and thermodynamical properties of electron system. The comparison with crystal bulk has shown that electron spectra of thin films is strongly influenced both by the film thickness and boundary conditions. The numerical calculations performed for thin metallic films demonstrate that surface states can be in the form of P-states or N-states. In the case of thick films some analytical considerations of surface states are also possible.

Keywords: Surface states, Thin films, Green's function

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NANO TUBES MODEL FOR DNA TRANSCRIPTION

Vjekoslav SAJFERT, Rajka DAJIĆ, Milan PANTIĆ, Bratislav TOŠIĆ

Abstract. Using the energy asymmetries in the hydrogen-binded structures the model is formulated explaining further decay of CAN double chain and also explaining further decay of only one of obtained single chains. The model is similar to the Scott's model of α-helix where the spiral is substituted with interacting discs. Explanation of mentioned DNA transformation is based on the estimate of free energy of discs with even number of hydrogen bonds.

Keywords: asymmetric energy, α-helix, DNA transformation

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ROTATIONAL HYSTERESIS OF SHINY ELECTROLITICAL NICKEL LAYERS

Minerva CRISTEA, Ioan DAMIAN, Maria BOLDAN, Mariana GANGĂL

Abstract. Rotational hysteresis is the discontinuous remagnetization phenomenon of a ferromagnetic substance which rotates uniformly in a magnetic field or which exists in a rotating magnetic field. The following goals are presented in the paper: a) the experimental effect curves - induced voltage (U) depending on the intensity of the magnetic field H(O-60 kA/m), at a constant rotating frequency; b) dependence of the induced voltage (U) on the rotating frequency (ν), of the samples (10-35 rot/s) in a constant magnetic field. Shiny nickel layers of different thickness (8.7 - 112 μm), deposited electrolytically from a concentrated bath on copper support, have been investigated. The characteristics of the effect curves depend on thickness and differ from those obtained for deposited electrolytically thin layers of nickel or laminated strips (0.1 mm; 0,4 mm) studies by other authors.

Keywords: hysteresis, ferromagnetic substance

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WITH THE RELATIVISTIC VELOCITY ADDITION LAW THROUGH SPECIAL RELATIVITY

Bernhard ROTHENSTEIN, Ioan ZAHARIE

Abstract. It is shown that if we can define a physical quantity with proper character in a given inertial reference frame (kinematic, dynamic, electromagnetic in its nature) which transforms when detected from a reference frame relative to which it moves with velocity u_x as $F = F^0 \Big/ \sqrt{1-\frac{u_x^2}{c^2}}$ then we can derive for it transformation equations following one and the same procedure, which involves the addition law of relativistic velocities which can be derived without using the Lorentz transformations. The transformation equation derived that way, generates the physical quantities u_xF and u'_xF', for which physicists invent names reflecting theirs physical meaning.

Keywords: physical quantity, inertial reference

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THE NATURE OF THE COULOMBIAN FIELD: WHY TWO FORMULAS FOR THE ELECTRIC FIELD CREATED BY A UNIFORMLY MOVING POINT CHARGE?

Bernhard ROTHENSTEIN, Ioan DAMIAN

Abstract. A derivation of the electric field created by a uniformly moving charge from its retarded position is presented. The derived formula has a general character showing how the electric field depends on the position of the point where the field is measured, on the time when the information about the creation of the field leaves the charge and on its velocity. The field described by the derived formula is mapped, showing the time variation of its components, of its magnitude and direction as measured at a given point in space and the magnitude and the direction of the field at different points in space but at the same instant of the time. Arguments are presented for the fact that a detachment of the electric field from its source takes place.

Keywords: coulombian field, time variation

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X-RAY INSPECTION OF PIPELINES HAVING LARGE DIAMETERS

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Abstract. Some of the basic ideas and procedures of the X – ray technique in checking the pipelines with large diameters are presented.

Keywords: X-ray technique

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