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ON THE CONVERSE STOLTZ THEOREM

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We consider the problem when the converse generalized Stoltz theorem is true. We obtain some conditions on the comparison sequence under which the complete or weak version of such a result is true on the family of all positive sequences. The same problem is solved for the important subclass of convex sequences which used in the theories of ultradifferential and entire functions. It is proved that our results cannot be improved. We construct some examples showing that the estimates found out for the class of convex sequences are better than the similar estimates for the class of all positive sequences.

Keywords: Stoltz theorem, Cesaro method, convex sequences.

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COMPLETE BIRESOURCE NETWORKS WITH LOOPS

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We consider the model of distribution of resources in the homogeneous and asymmetrical bilateral complete resource network with loops. Resource network called complete if any two vertices are connected with opposite arcs, it is called symmetric if for each pair of opposite arcs capacities are the same. We consider two kinds of resource distribution: first, if each arc contains one capacity; second, if each arc contains two capacities. The methods for finding of limit state for arbitrary total value the resource and of threshold of resource network are developed for each type of distribution.

Keywords: *resource network, flows in networks, flow distribution, biresource network, limit state, threshold.*

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MULTIPLICATIVE DISCRETE CONVOLUTION OPERATORS WITH COMPLEX CONJUGATE OPERATOR

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We consider the multiplicative discrete convolution operators, which include the complex conjugation operator, which is involutive. The study of such operators in ℓ_p -spaces is conducted by means of the method, which was developed by N.K. Karapetians and S.G. Samko for abstract equations with involutive operators. In the framework of this method, for such

multiplicative discrete convolution operators the symbol is defined. In terms of this symbol the necessary and sufficient conditions for the Fredholm property and the index computation formula are obtained. Also, there have been some important special cases.

Keywords: multiplicative discrete convolution, involutive operator, symbol, Fredholm property, index.

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STUDY OF THE SCATTERING PROPERTIES OF MULTILAYERED SPHERICAL NANOPARTICLES

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The diffraction problem of the plane wave scattering on the multilayered metal-dielectric spherical particle has been solved. The exact solution of the boundary problem has been given using Debye potential. Quasi-static approximation borders has been defined. Plasmonic resonances have been studied. The increase of resonance properties of metal nanoparticles by dielectric layers with high permittivity has been shown.

Keywords: Mi theory, light scattering, multilayered spheres, metal-dielectric structure.

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THERMOGRAVITATIONAL FLOW OF NON-UNIFORM FLUID IN THE BOUNDARY LAYER NEAR THE FREE SURFACE

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For the equations of fluid flow in Oberbeck-Boussinesq approximation is studied for non-uniform thermogravitational flow in the restriction on the free surface and the solid boundary. For fluid flow caused by the uneven heating of the free boundary, found similar solution in the boundary layer near the free surface. Thermocapillary effects are not taken into account. It is shown that depending on the direction of the longitudinal temperature gradient can arise either two rotational modes or multiple modes fluid flows without rotation.

Keywords: free surface, the Oberbek-Boussinesq approximation, boundary layer, rotation.

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ABOUT OSCILLATIONS OF HETEROGENEOUS PLATE WITH A RESILIENT SUPPORT EDGE

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The problem of determining the displacement and the resonance frequencies of the natural oscillations of a circular plate of variable stiffness with different boundary conditions is considered. The problem is reduced to a boundary value problem for the fourth-order differential operator with variable coefficients and solved numerically with the Ritz method. The natural frequencies and mode shapes, plate deflection at a given frequency was determined. The inverse problem of determining the coefficients of stiffness at the edge based on different approaches was solved. The first approach is based on deflection measurements at certain points; the second one is based on measuring the resonance values set.

Keywords: plate, heterogeneity, vibrations, elastic fixation, the Ritz method, reconstruction.

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INTEGRABILITY OF SYSTEMS OF THE FIRST AND SECOND DEGREE POLYNOMIALS OF SEVERAL VARIABLES OVER SIMPLE GALOIS FIELDS

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The properties of the derivatives in the direction of polynomials of several variables on simple Galois fields are studied. Necessary and sufficient conditions for integrability of the systems of the first and second degree polynomials are founded. The polynomials of several variables over Galois fields form the basis of the definition of the Reed-Muller codes, for which the new scheduled and soft-decision decoders are being actively developed in recent years. The results may be used to optimize the soft-decision decoders Sidel'nikov-Pershakov type decoder for Reed-Muller second and third order codes.

Keywords: *Galois fields, derivatives of polynomials, integrability of systems of polynomials, Reed-Muller codes, soft-decision decoding.*

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INVESTIGATION ELECTROMAGNETIC WAVE DIFFRACTION BY MULTILAYER NONLINEAR DIELECTRICS

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Investigation nonlinear phenomenon of electromagnetic wave diffraction by multilayer dielectric package concerned with dielectric cubic nonlinearity was ground on perturbation method. Computation of nonlinear response was made by Green function for multilayer dielectric package. There are found out resonances of third harmonic generation in coordinates «hade – wave length», also resonances of nonlinear influence for itself were found out.

Keywords: optical band, laser technology, nonlinear dielectric, third harmonic, Green function.

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ON STABILITY OF NONLINEARLY ELASTIC CYLINDER WITH INTERNAL STRESSES UNDER TENSION AND COMPRESSION

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The stability problem of nonlinearly elastic cylinder with internal stresses the cause of which is a wedge disclination was introduced. On the basis of the modified semi-inverse representation of the nonlinear elasticity theory, the equations of neutral equilibrium were derived for the two models of materials: harmonic and Blatz-Ko models. On the basis of the bifurcation approach the existence of the solution of linearized boundary value problems was studied. The critical values of ratio in length changes of the cylinder depending on parameter of the defect under tension and compression were obtained.

Keywords: disclination, stability, Volterra dislocation, extension, compression, internal stresses.

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