Contents

MATHEMATICS

PHYSICS

U.P.B. Sci. Bull., Series A, Vol. 70, No. 2, 2008 ISSN 1223-7027

STOCHASTIC RISK MODELS II

Gheorghe OPRIŞAN

The propose of the second part of this paper is to use the continuous time Markov processes (MP) and the Markov renewal processes (MRP) to obtain a generalization of the renewal model of collective risk for an extended period [0,t]. It is assumed that there exist m types of loss and hence more types of random claims. Asymptotic behavior for aggregate claims as $t \to \infty$ *are studies.*

Keywords: Markov renewal processes; collective risk; aggregate claims; additive functional; limit theorems.

A NOTE ON PROPER CONFORMAL VECTOR FIELDS IN CYLINDRICALLY SYMMETRIC STATIC SPACE-TIMES

Ghulam SHABBIR, Shaukat IQBAL

A study of proper conformal vector field in non conformally flat cylindrically symmetric static space-times is given by using the direct integration technique. Using the above mentioned technique we have shown that a very special class of the above space-time admits proper conformal vector fields.

Keywords: direct integration technique; conformal vector fields

ISOPERIMETRIC INEQUALITIES IN MINKOWSKI SPACE M_2

Radu F. CONSTANTIN

In the first part of this paper are presented two variational formulas in the space $\boldsymbol{M_2}$*, obtained by O. Bibestein in ([1]). These*

lead to the isoperimetric problem solved by H. Busemann in ([2]), ([3]).

The author obtain the inequality, $a^2 L_\Gamma^2 \geq 4A_\Gamma A_{\Gamma'}$, *where* Γ *is a convex, closed curve of class* C^1 *in* $\boldsymbol{M_2}$ *space, with the length* L_Γ *and the area* A_Γ. *The curve* Γ' *is a anti-cercle in* $\boldsymbol{M_2}$ *space, with the radius* $a > 0$ *and area* $A_{\Gamma'}$.

If $a = 1$ *and* $\Gamma' = T$, *where T is the isoperimetric in* $\boldsymbol{M_2}$ *space, we obtain the isoperimetric inequality,* $L^2 \geq 4A_\Gamma A_T$, *where* A_T *is the area of isoperimetric T.*

In the second part of the paper, this inequality is generalized for closed curves in $\boldsymbol{M_2}$, *which are not convex.*

A VERSION OF THE KRONECKER LEMMA

Gheorghe BUDIANU

In this work it is presented a version of Kronecker lemma concerning real number series and sequences. The results obtained are applied to the study of random variable sequences.

Key words: Stolz-Cesaro lemma**,** Kronecker lemma, random variable sequences.

ABSOLUTE CROSS SECTIONS MEASUREMENT IN TWO NUCLEONS TRANSFER REACTIONS

Sorin PASCU, Cristian MÜLLER, Gheorghe CĂTA-DANIL

Obtaining the absolute values for the nuclear reactions cross section is a difficult task of tremendous importance both for basic and applied nuclear physics. In the present work we developed a computation tool for calculating the cross sections based on the experimental intensities of the two neutrons transfer direct reactions.

The computer program is tested for the (p,t) reactions at 25 MeV beam energy on ^{134}Ba target.

Keywords: nuclear reactions, angular distributions, two nucleons transfer, cross sections.

BINDING ENERGY OF A SCREENED DONOR IN A CYLINDRICAL QUANTUM WIRE UNDER APPLIED MAGNETIC FIELDS

Ecaterina C. NICULESCU, Liliana BURILEANU

By a variational method, we calculate the binding energy of a screened hydrogenic donor in a GaAs-$Al_{0.3}Ga_{0.7}As$ quantum-well wire in the presence of a uniform magnetic field applied parallel to the wire axis. The binding energy is obtained as a function of the wire radius, the field strength and the screening parameter. Our results show that the effects of spatial variation of dielectric screening on edge wire donors are larger than those on center donors.

Keywords: binding energy, screened donor, quantum-well wire, variational method

ELECTRIC FIELD AND INTENSE LASER RADIATION EFFECTS ON THE INTERBAND TRANSITIONS IN QUANTUM WELLS

Ecaterina NICULESCU, Anca IORGA, Adrian RADU

The laser field dependence of the interband optical transition in a square quantum well (SQW) under an applied electric field is evaluated in the effective mass approximation. At weak laser field a quadratic dependence of the transition energy as a function of laser parameter is found, while for higher values of the parameter this dependence becomes cvasilinear. These results show that the emission

frequencies associated with quantum well lasers can be tuned by external fields.

Key words: square quantum well, laser field, recombination rate, photoluminiscence.

THREE DIMENSIONAL IMAGING OF CULTURAL HERITAGE AS A BASIS FOR GETTING TO KNOW CULTURAL ASSETS

Dragoş ENE, Walter MĂRĂCINEANU, Cristian DECIU, Roxana RADVAN

This paper presents the 3D acquisition advantages versus cultural heritage preservation and reconstruction of Romanian's cultural objectives that made the object of 3D scanning during the year 2006. It is used laser technique to produce high resolution models of the object.

The result of this method, much better than the traditional ones (i.e. photogrammetry), is followed to be used with connected investigation methods, being part of a complex mobile laboratory. Depending by the object's surface the resolution may take values from 0.15 mm. Time to scan an area of 1m^2 at a medium resolution (less than 1mm) is 20 minutes.

Keywords: 3D scanning, mesh, triangulation, time-of-flight, cultural heritage