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Zbl 1147.60010

Esquivel, M.L.

Probability generating functions for discrete real-valued random variables. (English)
Theory Probab. Appl. 52, No. 1, 40-57 (2008) and *Teor. Veroyatn. Primen.* 52, No. 1, 129-149 (2007).

Summary: The probability generating function is a powerful technique for studying the law of finite sums of independent discrete random variables taking integer positive values. For real-valued discrete random variables, the well-known elementary theory of Dirichlet series and the symbolic computation packages available nowadays, such as Mathematica 5, allow us to extend this technique to general discrete random variables. Being so, the purpose of this work is twofold. First, we show that discrete random variables taking real values, nonnecessarily integer or rational, may be studied with probability generating functions. Second, we intend to draw attention to some practical ways of performing the necessary calculations.

MSC 2010

60E10 Transforms of probability distributions
 05A15 Exact enumeration problems, generating functions
 60E05 General theory of probability distributions

Keywords

probability generating functions; finite sums of independent real-valued discrete random variables; Dirichlet series

Zbl 1172.90454

Esquivel, Manuel L.

A conditional Gaussian martingale algorithm for global optimization. (English)

Gavrilova, Marina (ed.) et al., Computational science and its applications – ICCSA 2006. International conference, Glasgow, UK, May 8–11, 2006. Proceedings, Part III. Berlin: Springer (ISBN 3-540-34075-0/pbk). Lecture Notes in Computer Science 3982, 841-851 (2006).

Summary: A new stochastic algorithm for determination of a global minimum of a real-valued continuous function defined on K , a compact set of \mathbb{R}^n , having an unique global minimizer in K is introduced and studied, a context discussion is presented and implementations are used to compare the performance of the algorithm with other algorithms. The algorithm may be thought to belong to the random search class but although we use Gaussian distributions, the mean is changed at each step to be the intermediate minimum found at the preceding step and the standard deviations, on the diagonal of the covariance matrix, are halved from one step to the next. The convergence proof is simple relying on the fact that the sequence of intermediate random minima is an uniformly integrable conditional Gaussian martingale.

MSC 2010

90C15 Stochastic programming
 90C59 Approximation methods and heuristics

Zbl 1134.60005

Grossinho, Maria do Rosário (ed.); Shiryayev, Albert N. (ed.); Esquivel, Manuel L. (ed.); Oliveira, Paulo E. (ed.)

Stochastic finance. Selected papers based on the presentations at the international conference on stochastic finance 2004, Lisbon, Portugal, September 26--30, 2004. (English)
 New York, NY: Springer (ISBN 0-387-28262-9/hbk). xiv, 364 p. EUR 88.76; SFR 140.50 (2006).

The articles of this volume will be reviewed individually.

MSC 2010

60-06 Proceedings of conferences (probability theory)
 91-06 Proceedings of conferences (Social and behavioral sciences)
 00B25 Proceedings of conferences of miscellaneous specific interest

Zbl 1082.60041

Esquivel, Manuel L.

On the asymptotic behavior of the second moment of the Fourier transform of a random measure. (English)

Int. J. Math. Math. Sci. 2004, No. 61-64, 3423-3434 (2004).

The author obtains an estimate for the asymptotic behavior of the second moment of the Fourier transform of the limit random measure in the theory of multiplicative chaos. After looking at the behavior at infinity of the Fourier transform of some remarkable functions and measures, the author proves a formula essentially due to Frostman, involving the Riesz kernels.

Reviewer: Ferenc Weisz (Budapest)

MSC 2010

60G57 Random measures
42B10 Fourier type transforms, several variables

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Zbl 0925.90125

Esquivel, Manuel L.

Some risk processes associated to the dept function of a loan with variable interest rates. (English)

Z. Angew. Math. Mech. 76, Suppl. 3, 419-420 (1996).

MSC 2010

91B30 Risk theory, insurance

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Zbl 0898.60047

Esquivel, Manuel Leote

Applications of Fourier methods to the analysis of some stochastic processes. (English; Portuguese)

Lisboa: Univ. Nova de Lisboa, Faculdade de Ciências e Tecnologia, xv, 101 p. (1996).

Summary: In the first chapter, a class of random periodic Schwartz distributions is introduced, some examples, elementary properties and a characterization result are studied and three applications are presented. A random Schwartz periodic distribution is, for us, just a function defined in a complete probability space and taking values in the space of Schwartz distributions over the line, that are left invariant by an integer translation, endowed with the natural algebraic and topological structures. The second chapter deals, primarily, with an extension of the methods of Kahane, as applied to the Brownian sheet, in what concerns analogs of the rapid points. After presenting the Brownian sheet process, by way of Gaussian white noise, some results, on the local behavior of this process and for some other processes associated with the sheet, are derived using the Schauder series representation.

In the third chapter, we prove a formula essentially due to Frostman, we look at the behavior at infinity of the Fourier transform of some remarkable functions and measures and, finally, we study the asymptotic behavior of the second moment of the Fourier transform of a random measure that appears in the theory of multiplicative chaos. In the last chapter, a class of random tempered distributions on the line is introduced by considering random series, in the usual Hermite functions, having as coefficients random variables which satisfy certain growth conditions. This class is shown to be exactly the class of random Schwartz distributions having a mean. We present also a study on a possible converse of a result on Brownian distributions, that leads to a moment problem.

MSC 2010

60G20 Generalized stochastic processes
60G17 Sample path properties
42B10 Fourier type transforms, several variables
46F25 Distributions on infinite-dimensional spaces

Keywords

random Schwartz periodic distribution; Brownian sheet; Fourier transform of a random measure; moment problem

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Zbl 0862.60030

Esquivel, Manuel L.

On the local behavior of the Brownian sheet. (English)

Fouque, Jean-Pierre (ed.) et al., Stochastic analysis: random fields and measure-valued processes. Papers of the binational France-Israel symposium on the Brownian sheet, September 1993, and the conference on measure-valued branching and superprocesses, May 1995, Ramat Gan, Israel. Ramat-Gan: Bar-Ilan University, Isr. Math. Conf. Proc. 10, 81-89 (1996).

Summary: In his seminal book "Some random series of functions" (1985; [Zbl 0571.60002](#)), J.-P. Kahane has shown, in a systematic way, how to take advantage of Paul Lévy's construction of the Brownian process, using the Haar functions, in order to study the local behavior of this process. To reach this goal Kahane looks at the Haar's interpolation of the Brownian process done by Lévy, as a series expansion in the Schauder system, having Gaussian random variables as coefficients, and exploits this series representation with sharp estimates of the distribution function of the maximum of a finite subfamily of a normal sequence. With this method Kahane gets easily the results corresponding to the existence of rapid points and slow points [which were first discovered by S. Orey and S. J. Taylor, Proc. Lond. Math. Soc., III. Ser. 28, 174-192 (1974; [Zbl 0292.60128](#)) and J.-P. Kahane, in: Conf. Harmonic Analysis in honor of A. Zygmund 1, 67-83 (1983; [Zbl 0532.42001](#)), respectively]. The present work deals with an extension of the methods of Kahane as applied to the Brownian sheet, in what concerns an analog of the rapid points.

MSC 2010

60G17 Sample path properties
42C15 General harmonic expansions, frames

Keywords

Brownian process; Haar functions; Brownian sheet

Citations

Zbl 0805.60007; Zbl 0273.60039; Zbl 0192.53801; Zbl 0532.42001; Zbl 0571.60002; Zbl 0292.60128

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[Comment on this Item](#)Zbl 0842.60052**Esquivel, Manuel L.****Points of rapid oscillation for the Brownian sheet via Fourier-Schauder series representation.**

(English)

Kalton, Nigel (ed.) et al., Interaction between functional analysis, harmonic analysis, and probability.

Proceedings of a conference held at the University of Missouri, Columbia, MO, USA, May 29-June 3, 1994.

New York, NY: Marcel Dekker. Lect. Notes Pure Appl. Math. 175, 153-162 (1996).

Summary: The representation of the Brownian sheet as a sum of a series, which converges uniformly almost surely, of Schauder functions having as coefficients normal random variables, is a simple consequence of the definition of the Brownian sheet using Gaussian white noise. Some results on the local behavior of the Brownian sheet and for some other processes associated with the sheet, can be derived by using this representation. Namely, a uniform modulus of continuity, nondifferentiability results and at some points, faster oscillation than the one prescribed by the laws of iterated logarithm. In previous work [the author, "On the local behavior of the Brownian sheet", in: Isr. Math. Conf. Proc., AMS 1994] rapid points and almost sure everywhere nondifferentiability for the location homogeneous part of the Fourier-Schauder series representation were presented. Here we show the existence of rapid points for the independent increments of the Brownian sheet, using the same method. This method, first used by J.-P. Kahane ["Some random series of functions" (1968; [Zbl 0192.53801](#))] to deal with similar properties of the Brownian unidimensional time process, consists on exploiting the Fourier-Schauder representation with sharp estimates of the distribution function of the maximum of a finite subfamily of a normal sequence. Some results on the usual increments behavior are also presented.

MSC 2010

60G60 Random fields

60B05 Probability measures on topological spaces

60J65 Brownian motion

Keywords

Brownian sheet; modulus of continuity; series representation; Fourier-Schauder representation; increments behavior

Citations

Zbl 0571.60002; Zbl 0192.53801

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[Comment on this Item](#)Zbl 0846.41007**Esquivel, Manuel L.****An introduction to limited polynomial expansions.** (Portuguese)Bol. Soc. Port. Mat. 30, 1-26 (1994).

This is a basically expository article. Its main objective is to show the advantages of the well-known representation of the real functions $f: \mathbb{R} \rightarrow \mathbb{R}$ by means of their limited polynomial expansions (Taylor theorem). With illustrative character several elementary examples, comments and applications are given so that the didactic content of the paper is a feature to be remarked.

Reviewer: N.Hayek (La Laguna)

MSC 2010

41A10 Approximation by polynomials

26-01 Textbooks (real functions)

Keywords

Taylor theorem; real functions; limit polynomial expansions

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[Comment on this Item](#)Zbl 0809.46033**Esquivel, Manuel L.****On a class of periodic random distributions. (Sur une classe de distributions aléatoires périodiques.)** (French)Ann. Sci. Math. Qué. 17, No.2, 169-186 (1993).

Summary: The theoretical foundations for the study and application of periodic random distributions have been established since at least the sixties. In the context of the fractal geometry of Benoit Mandelbrot, mathematical models of irregular surfaces that can be obtained by computer have led us to consider stochastic processes arising from Fourier series with random coefficients. In this article, we introduce a class of such periodic random distributions. Three examples of this case are: random mass on the unit circle, Brownian motion (classical and fractional) and classical Schwartz distributions that are randomized by translations. We begin with a result giving conditions which characterize the distributions of this class. These conditions are easy to verify and this is done for the three previous examples.

Two important questions in harmonic analysis are considered: uniqueness of the representation by Fourier series and differentiability. Also, we examine the statistical problem of the existence of a generalized first moment for these random distributions. As an application, a classical result in Fourier analysis, useful for constructing particular solutions of ordinary differential equations with constant coefficients, is generalized to this class of periodic random distributions. This last result is applied to obtain the Fourier-Wiener-Schwartz

series of a particular solution of a generalized Langevin equation. We conclude with a comment on the regularity of the solution.

MSC 2010

46F10 Operations with distributions (generalized functions)
60E99 Distribution theory in probability theory
28A80 Fractals

Keywords

periodic random distributions; fractal geometry of Benoit Mandelbrot; Fourier series with random coefficients; random mass on the unit circle; Brownian motion; classical Schwartz distributions that are randomized by translations; existence of a generalized first moment; Fourier-Wiener-Schwartz series; Langevin equation; regularity

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Zbl 0828.52003

Esquivel, Manuel L.; de O.Martins, Maria Ana F.

On a basic theorem on the geometry of convex sets. (Portuguese)
Bol. Soc. Port. Mat. 23, 22-32 (1992).

This is an expository article. First some simple properties of convex sets in \mathbb{N} -space are given and then some theorems on the separation of convex sets from affine subspaces and other convex sets are proved.
Reviewer: Bernd Wegner (Berlin)

MSC 2010

52A20 Convex sets in \mathbb{N} dimensions (including convex hypersurfaces)

Keywords

convex sets; separation; affine subspaces

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Zbl 0743.46039

Esquivel, Manuel L.

On some applications of harmonic analysis of a class of random distributions. (Portuguese)
Analysis, Proc. 15th Port.-Span. Meet. Math., Évora/Port. 1990, Vol. II, 285-290 (1991).

Summary: [For the entire collection see [Zbl 0741.00014](#).]

Fractional Brownian movement is shown to be an example of a class of random Schwarz periodic distributions introduced and studied by the author in [Sur une application de l'analyse harmonique d'une class de distributions aleatoires, Relatório Técnico 890927, Mat. Esq. 1- F.C.T.-U.N.L.]. Using results there reported, a particular solution for a generalized Langevin equation is represented as a Fourier-Wiener-Schwartz series. A comment on the regularity of the solution is given.

MSC 2010

46F25 Distributions on infinite-dimensional spaces
60G20 Generalized stochastic processes

Keywords

Fractional Brownian movement; random Schwarz periodic distributions; particular solution for a generalized Langevin equation; Fourier-Wiener- Schwartz series; regularity of the solution

Citations

Zbl 0741.00014

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Zbl 0676.35011

Esquivel, Manuel L.

Sur la méthode des séries de Fourier dans les équations différentielles à coefficients constants. (On the method of Fourier series for differential equations with constant coefficients). (French)
Trab. Invest. 2, 35 p. (1987).

The author extends the method of Fourier series to obtain solutions of the differential equation $P(D)u=f$ ($P(D)$ = differential polynomial with constant coefficients) to the case where f does not satisfy the so called compatibility conditions $P(n)=0 \Rightarrow f^{(n)}=0$ ($f^{(n)}$ = coefficient of the Fourier-Schwartz transform).
Reviewer: R.Salvi

MSC 2010

35E20 General theory of PDE with constant coefficients
35C10 Series solutions of PDE

Keywords

Fourier series; differential polynomial; constant coefficients; Fourier- Schwartz transform

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Zbl 0606.28001

Esquivel, Manuel L.

Note sur les inclusions $L^{\mu_1} \subset L^{\lambda_1}$. (A note on the inclusions $L^{\mu_1} \subset L^{\lambda_1}$). (French)
Trab. Invest. 1, 5 p. (1985).

In this note we explicitly enunciate and prove an easy and perhaps known condition on the Radon-Nikodým derivative of one measure relative to another, in order to get set inclusion of their respective L^1 spaces.

Let λ and μ be two σ -finite measures over a measure space and let $d\mu = h d\lambda + d\mu \perp \lambda$ be the Lebesgue Radon-Nikodým decomposition of μ with respect to λ . A necessary and sufficient condition for $L^1 \mu \subseteq L^1 \lambda$ is that: $\exists K > 0 \lambda(\{h < K\}) = 0$.

No priority research about this subject has been done by the author.

MSC 2010

28A15 Abstract differentiation theory, differentiation of set functions
 28A25 Integration with respect to measures and other set functions
 46E30 Spaces of measurable functions
 46E35 Sobolev spaces and other spaces of "smooth" functions, embedding theorems, trace theorems

Keywords

L^1 inclusions; Radon-Nikodým derivative; Lebesgue Radon- Nikodým decomposition

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Zbl 0582.10024

Gamas, Carlos D.; Esquivel, Manuel L.

A property of periodic functions. (Portuguese)

Bol. Soc. Port. Mat. 5, 56-59 (1982).

Die Autoren "zeigen", daß für irrationales α die Folge $n\alpha$ direkt modulo 1 ist (Satz 1), für rationale Zahlen aber nicht (Satz 2). Zum Beweis zitieren sie noch das entsprechende Resultat über die Gleichverteilung der Folge $(n\alpha)$!! Ein Aprilscherz ? Die zitierten Resultate und Namen sind selten richtig geschrieben.

Reviewer: H.Rindler

MSC 2010

11J71 Distribution modulo one

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