

MR2682148 (2011d:62050) 62F10 (60E10 60F17)

Esquivel, Manuel L. (P-NULST-DM2)

Some applications of probability generating function based methods to statistical estimation.
 (English summary)

Discuss. Math. Probab. Stat. **29** (2009), *no. 2*, 131–153.

Summary: “After recalling previous work on probability generating functions for real-valued random variables, we extend to these random variables uniform laws of large numbers and a functional limit theorem for the empirical probability generating function. We present an application to the study of continuous laws, namely, estimation of parameters of Gaussian, gamma and uniform laws by means of a minimum contrast estimator that uses the empirical probability generating function of the sample. We test the procedure by simulation and we prove the consistency of the estimator.”

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MR2354573 (2008k:60039) 60E10 (05A15 60E05)

Esquivel, M. L. (P-NULST-DM2)

Probability generating functions for discrete real-valued random variables.
 (English. Russian summary)

Teor. Veroyatn. Primen. **52** (2007), *no. 1*, 129–149; translation in *Theory Probab. Appl.* **52** (2008), *no. 1*, 40–57.

A number of characteristics and techniques related to probability generating functions (pgf's) of integer-valued random variables are extended to the case of discrete real-valued random variables. Among these are the determination of the convergence domain of the pgf, the generation of the probabilities and the pgf of a sum of independent and identically distributed random variables.

Reviewed by *Demetrios L. Antzoulakos*

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MR2238827 (2007a:60006) 60-06 (91-06 91B28)

★**Stochastic finance.**

Papers from the International Conference held at the Universidade Técnica de Lisboa, Lisbon, September 26–30, 2004.

Edited by A. N. Shiryaev, M. R. Grossinho, P. E. Oliveira and M. L. Esquível.

Springer, New York, 2006. xiv+364 pp. \$99.95. ISBN 978-0387-28262-6; 0-387-28262-9

Contents: Yacine Aït-Sahalia, Per A. Mykland and Lan Zhang, How often to sample a continuous-time process in the presence of market microstructure noise [Rev. Financ. Stud. **18** (2005), no. 2, 351–416] (3–72); Ole E. Barndorff-Nielsen and Neil Shephard, Multipower variation and stochastic volatility (73–82) [MR2230760](#); Tomasz R. Bielecki, Monique Jeanblanc and Marek Rutkowski, Completeness of a general semimartingale market under constrained trading (83–106) [MR2230761 \(2007m:91070\)](#); Vicky Fasen, Claudia Klüppelberg and Alexander Lindner, Extremal behavior of stochastic volatility models (107–155) [MR2230762 \(2007k:60203\)](#); Eckhard Platen, Capital asset pricing for markets with intensity based jumps (157–182) [MR2230763](#); Stanley R. Pliska, Mortgage valuation and optimal refinancing (183–196) [MR2230764 \(2007d:91116\)](#); Wolfgang Runggaldier and Sara Di Emidio, Computing efficient hedging strategies in discontinuous market models (197–212) [MR2230765](#); Lian Yu, Shuzhong Zhang and Xun Yu Zhou, A downside risk analysis based on financial index tracking models (213–236) [MR2230766 \(2007d:91108\)](#); Svetlana Borovkova and Ferry Jaya Permana, Modelling electricity prices by the potential jump-diffusion (239–263) [MR2230767](#); Raquel M. Gaspar, Finite dimensional Markovian realizations for forward price term structure models (265–320) [MR2230768 \(2008h:60268\)](#); Albrecht Irle and Jörn Sass, Good portfolio strategies under transaction costs: a renewal theoretic approach (321–341) [MR2230769 \(2007j:91057\)](#); Jeannette H. C. Woerner, Power and multipower variation: inference for high frequency data (343–364) [MR2230770 \(2008h:60274\)](#).

{Most of the papers are being reviewed individually.}

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MR2130436 (2006b:60106) 60G57 (42A38 42B10)

Esquível, Manuel L. (P-NULST-DM2)

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

Int. J. Math. Math. Sci. **2004**, no. 61-64, 3423–3434.

The behaviour of the Fourier transform of random measures arising in the context of multiplicative chaos is investigated. In particular, the author, after a brief review of the main multiplicative chaos results, gives a detailed analysis of the asymptotic behaviour of the second moment of the Fourier

transform of the random measure. Moreover, the analysis is applied to some other examples of measures.

Reviewed by [Flora Koukiou](#)

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MR1608676 (98m:60063) 60G20 (42A99 60G17)

Esquivel, Manuel Leote Tavares Inglês (P-NULST)

★ **Applications of Fourier methods to the analysis of some stochastic processes. (English, Portuguese summaries)**

Dissertation, Universidade Nova de Lisboa, Lisbon, 1996.

Text in English and Portuguese.

Universidade Nova de Lisboa, Departamento de Matemática, Lisbon, 1996. 241 pp.

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 is 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 analogues 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, look at the behavior at infinity of the Fourier transform of some remarkable functions and measures and, finally, 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.”

Contents: Chapter I. Amenable periodic distributions; Chapter II. Local behavior of the Brownian sheet; Chapter III. The asymptotic behavior of a Fourier transform; Chapter IV. Amenable random Schwartz distributions; Bibliography.

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MR1429622 (98b:60079) 60G20 (42A61)

Esquivel, Manuel L. (P-NULST-DM2)

On the space of random tempered distributions having a mean. (English summary)

Classical analysis (Kazimierz Dolny, 1995), 13–47, Wars. Agric. Univ. Press, Warsaw, 1996.

Summary: “A class of random tempered distributions on \mathbf{R} 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. Otherwise stated, we obtain a characterization of the stochastic processes with a first moment and having as trajectories tempered distributions. As important examples of this class, we introduce a Brownian type process on \mathbf{R} and recall the Brownian distributions of J.-P. Kahane. We present a study on a possible converse of a result on Brownian distributions which leads to a moment problem.”

{For the entire collection see [MR1429620 \(97g:00018\)](#)}

Reviewed by [Habib Ouerdiane](#)

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MR1415189 (98f:60094) 60G60 (60G15 60G17)

Esquivel, Manuel L. (P-NULST-DM2)

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

Stochastic analysis: random fields and measure-valued processes (Ramat Gan, 1993/1995), 81–89, *Israel Math. Conf. Proc.*, 10, Bar-Ilan Univ., Ramat Gan, 1996.

Following methods developed by J.-P. Kahane [*Some random series of functions*, Second edition, Cambridge Univ. Press, Cambridge, 1985; [MR0833073 \(87m:60119\)](#)] for Brownian motion, the author gives the Haar representation of the Brownian sheet as a double series with independent standard Gaussian coefficients that multiply tensor products of triangular-shaped Schauder functions. This representation is used to give a bound on the modulus of continuity of the Brownian sheet: in the unit square, increments of length h are bounded by a constant times $(h \log(1/h))^{1/2}$. The existence of points of rapid oscillation is also proved, that is, points at which some increments of order h are at least a constant times $h(\log(1/h))^{1/2}$. A non-differentiability result that directly generalizes the one for Brownian motion is also given. Further results by the author can be found elsewhere [in *Interaction between functional analysis, harmonic analysis, and probability*

(Columbia, MO, 1994), 153–162, Dekker, New York, 1996; [MR1358152 \(96j:60068\)](#)]. A different kind of non-differentiability result for the Brownian sheet can be found in [R. C. Dalang and T. S. Mountford, *Ann. Probab.* **24** (1996), no. 1, 182–195; [MR1387631 \(97c:60129\)](#)].

{For the entire collection see [MR1415182 \(97d:60005\)](#)}

Reviewed by [Robert C. Dalang](#)

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MR1358152 (96j:60068) [60G15](#) ([42C10](#) [60G17](#))

Esquivel, Manuel L. (P-NULST-DM2)

Points of rapid oscillation for the Brownian sheet via Fourier-Schauder series representation. (English summary)

Interaction between functional analysis, harmonic analysis, and probability (Columbia, MO, 1994), 153–162, Lecture Notes in Pure and Appl. Math., 175, Dekker, New York, 1996.

The author uses the representation of a Brownian sheet as the sum of a series of Schauder functions with normal random variables as coefficients to obtain interesting sample path properties of the sheet. The technique was first exploited by J.-P. Kahane [*Some random series of functions*, Second edition, Cambridge Univ. Press, Cambridge, 1985; [MR0833073 \(87m:60119\)](#)] to obtain similar properties of the Wiener process: it uses sharp estimates for the distribution of the maximum of a finite subfamily of a normal sequence. G. J. Zimmerman [*Ann. Math. Statist.* **43** (1972), 1235–1246; [MR0317401 \(47 #5948\)](#)] established the law of iterated logarithm for independent increments of the Brownian sheet. In this paper it is shown that a.s. there are exceptional “rapid” points where the upper asymptotic growth rate has the log log term replaced by a log term. It would be of interest to calculate the dimension of this set of rapid points as well as the constant which provides a uniform modulus of continuity for the increments of the sheet.

{For the entire collection see [MR1358139 \(96f:00024\)](#)}

Reviewed by [S. J. Taylor](#)

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MR1463576 (98e:90054) 90A46

Esquivel, Manuel L. (P-NULST-DM2)

A mathematical model for risk assessment of loans. (English summary)

Bol. Inst. Actuar. Port. No. 34 (1994), 19–37.

Summary: “A mathematical notion for a quantified evaluation of the risk of a loan is introduced and some of its properties are presented.

“To begin with, a restricted number of precise but stringent assumptions on the expected behaviour of a risk process concept are formalized in a very simple Cauchy problem. Then the explicit solution of this problem is seen to maintain a well defined mathematical sense under more general hypotheses and this enlarged interpretation is thus taken as a definition of the risk process associated with a loan.

“This more abstract notion of risk process is made to depend strongly on a (stochastic) process which we assume to convey information on the uncertainty of the general environmental conditions prevailing along the time span of the loan. As a precise mathematical model of such an uncertainty process is not yet available, we present some examples of processes which fit in the framework of hypotheses expected to hold for an uncertainty process.

“The main examples presented are given as products of a process of bounded variation with a continuous local martingale. These local martingales are simply built on a standard Brownian process by a nonrandom change of time and then by squaring or taking the exponential of the stochastic process obtained. The risk of the load will be (a random variable) given (almost surely) by the L^1 norm of the risk process of the loan. Next, we derive conditions on the loan under which a control of the correspondent risk of the loan is obtained, using only elementary results on Ito’s integral with respect to the uncertainty process chosen.

“A precise procedure is proposed for testing both this theory and an eventual practical application of it. Finally, a few comments are made on some of the limitations of the work presented.”

Reviewed by [Angelos Dassios](#)

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MR1259373 (94m:60086) 60G20 (60H10)

Esquivel, Manuel L. (P-NULST-DM2)

Sur une classe de distributions aléatoires périodiques. (French. English, French summaries)

[On a class of periodic random distributions]

Ann. Sci. Math. Québec **17** (1993), no. 2, 169–186.

In this paper the author studies periodic random distributions whose Fourier coefficients form an integrable random sequence with slowly increasing expectation. In particular, he characterizes

such a sequence, and defines and studies the expectation and the derivative of such a periodic random distribution. He gives three examples of these random distributions: random masses on the circle, classical and fractional Brownian motions, and randomizations by translations of a periodic distribution, and calculates their Fourier coefficients. Finally, he studies the existence of a periodic random solution of a linear differential equation whose right-hand side is a periodic random distribution, and in particular that of the Langevin equation (whose right-hand side is a fractional Brownian motion), as well as the regularity of this solution. In an appendix he gives another proof, which is quite complicated but interesting (because it uses stopping times), of a result concerning integrable random sequences.

Reviewed by [Vo-Khac Khoan](#)

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MR1161742 [60G20](#) ([46F25](#))

Esquivel, Manuel L. (P-NULST-DM2)

On some applications of harmonic analysis to a class of random distributions. (Portuguese. English summary)

Proceedings of the XVth Portuguese-Spanish Conference on Mathematics, Vol. II (Portuguese) (Évora, 1990), 285–290, Univ. Évora, Évora, 1991.

{This item will not be reviewed individually.}

{For the entire collection see [MR1161695](#) ([92m:00049](#))}

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MR969368 ([89m:34010](#)) [34A25](#) ([34A30](#) [42A16](#) [46F10](#))

Esquivel, Manuel L.

★**Sur la méthode des séries de Fourier dans les équations différentielles à coefficients constants. (French) [The Fourier-series method in differential equations with constant coefficients]**

Trabalhos de Investigação [Research Monographs], 87-2.

Universidade Nova de Lisboa, Departamento de Matemática, Lisbon, 1987. 35 pp.

The author applies the method of Fourier-Schwartz series to construct particular solutions of

differential equations of the form $(*) P(D)u = f$, where $P(\cdot)$ is a polynomial with constant coefficients and f a periodic distribution. The existence of a periodic distribution satisfying $(*)$ is guaranteed by a compatibility condition between the zeros of P and the Fourier coefficients of f [see R. E. Edwards, *Fourier series*, Vol. 2, second edition, see p. 126, Springer, New York, 1982; [MR0667519 \(83k:42001\)](#)]. When this condition is not satisfied, other distributional solutions can exist but are necessarily nonperiodic; in this case, by modifying locally the right-hand side of $(*)$ and using the resulting Fourier-Schwartz coefficients, the author obtains a new compatibility condition between f and P allowing one to find the solution of $(*)$ (i.e., to find a periodic distributional solution) on $D(\Omega)$ (Ω an open interval), f being now any distribution.

Reviewed by [N. Hayek Calil](#)

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