Infinite Divisibility of Gaussian Squares with Non-zero Means

Michael B. Marcus, *The City College of CUNY*
Jay Rosen, *The College of Staten Island of CUNY*

Abstract

We give necessary and sufficient conditions for a Gaussian vector with non-zero mean, to have infinitely divisible squares for all scalar multiples of the mean, and show how the this vector is related to the local times of a Markov chain determined by the covariance matrix of the Gaussian vector. Our results add to results of Griffiths, Bapat, Eisenbaum and Kaspi.

Full text: PDF | PostScript

Pages: 364-376

Published on: June 27, 2008

Bibliography

1. Bapat, R. B. Infinite divisibility of multivariate gamma distributions and M-matrices. *Sankhya Ser. A* 51 (1989), no. 1, 73--78. MR1065560 (91i:60043)
2. Eisenbaum, Nathalie. On the infinite divisibility of squared Gaussian processes. *Probab. Theory Related Fields* 125 (2003), no. 3, 381--392. MR1964459 (2004b:60050)
3. Eisenbaum, Nathalie. A connection between Gaussian processes and Markov processes. *Electron. J. Probab.* 10 (2005), no. 6, 202--215 (electronic). MR2120243 (2005m:60071)
4. Eisenbaum, Nathalie; Kaspi, Haya. A characterization of the infinitely divisible squared Gaussian processes. *Ann. Probab.* 34 (2006), no. 2, 728--742. MR2223956 (2007d:60012)
5. Eisenbaum, Nathalie; Kaspi, Haya; Marcus, Michael B.; Rosen, Jay; Shi, Zhan. A Ray-Knight theorem for symmetric Markov processes. *Ann. Probab.* 28 (2000), no. 4, 1781--1796. MR1813843 (2002j:60138)
6. Feller, William. An introduction to probability theory and its applications. Vol. II. Second edition *John Wiley & Sons, Inc., New York-London-Sydney* 1971 xxiv+669 pp. MR0270403 (42 #5292)
7. Griffiths, R. C. Characterization of infinitely divisible multivariate gamma distributions. *J. Multivariate Anal.* 15 (1984), no. 1, 13--20. MR0755813 (85m:60027)
8. Marcus, Michael B.; Rosen, Jay. Markov processes, Gaussian processes, and local times. Cambridge Studies in Advanced Mathematics, 100. *Cambridge University Press, Cambridge,* 2006. x+620 pp. ISBN: 978-0-521-86300-1; 0-521-86300-7 MR2250510 (2008b:60001)
9. Marcus, Michael B.; Rosen, Jay. Existence of a critical point for the infinite divisibility of squares of Gaussian vectors in R^2 with non--zero mean, preprint, (2008), arXiv:0806.3188.