Distribution of the Brownian motion on its way to hitting zero

Pavel Chigansky, *The Hebrew University*
Fima C. Klebaner, *Monash University*

Abstract

For the one-dimensional Brownian motion $B=(B_t)_{t \geq 0}$, started at $x > 0$, and the first hitting time $\tau = \inf\{t \geq 0 : B_t = 0\}$, we find the probability density of $B_{u\tau}$ for a $u \in (0,1)$, i.e. of the Brownian motion on its way to hitting zero.

Full text: PDF | PostScript

Pages: 641-648

Published on: December 17, 2008

Bibliography

1. Blumenthal, Robert M. Excursions of Markov processes. Probability and its Applications. *Birkhäuser Boston, Inc., Boston, MA*, 1992. xii+275 pp. ISBN: 0-8176-3575-0 MR1138461 (93b:60159)
2. Borodin, Andrei N.; Salminen, Paavo. Handbook of Brownian motion---facts and formulae. Second edition. Probability and its Applications. *Birkhäuser Verlag, Basel*, 2002. xvi+672 pp. ISBN: 3-7643-6705-9 MR1912205 (2003g:60001)
3. Doob, Joseph L. Classical potential theory and its probabilistic counterpart. Reprint of the 1984 edition. Classics in Mathematics. *Springer-Verlag, Berlin*, 2001. xxvi+846 pp. ISBN: 3-540-41206-9 MR1814344 (2001j:31002)
4. Fitzsimmons, Pat; Pitman, Jim; Yor, Marc. Markovian bridges: construction, Palm interpretation, and splicing. *Seminar on Stochastic Processes, 1992 (Seattle, WA, 1992)*, 101--134, Progr. Probab., 33, *Birkhäuser Boston, Boston, MA*, 1993. MR1278079 (95i:60070)
5. Jagers, Peter; Klebaner, Fima C.; Sagitov, Serik. Markovian paths to extinction. *Adv. in Appl. Probab.* 39 (2007), no. 2, 569--587. MR2343678 (2008g:60258)
6. Jagers, Peter; Klebaner, Fima C.; Sagitov, Serik. *Proc Natl Acad Sci USA*, 104 (15):6107--6111, April 2007
7. Rogers, L. C. G.; Williams, David. Diffusions, Markov processes, and martingales. Vol. 2. Itô calculus. Reprint of the second (1994) edition. Cambridge Mathematical Library. *Cambridge University Press, Cambridge*, 2000. xiv+480 pp. ISBN: 0-521-77593-0 MR1780932 (2001g:60189)