

On the Existence of Recurrent Extensions of Self-similar Markov Processes

Patrick J Fitzsimmons, *UC San Diego*

Abstract

Let $X = (X_t)_{t \geq 0}$ be a self-similar Markov process with values in the non-negative half-line, such that the state 0 is a trap. We present a necessary and sufficient condition for the existence of a self-similar recurrent extension of X that leaves 0 continuously. This condition is expressed in terms of the Lévy process associated with X by the Lamperti transformation.

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Bibliography

1. J. Bertoin and M. Yor. Exponential functionals of Lévy processes. *Probab. Surv.* 2 (2005), 191-212. [Math. Review MR2178044](#)
2. R. M. Blumenthal. On construction of Markov processes. *Z. Wahrsch. Verw. Gebiete* 63 (1983), 433-444. [Math. Review MR705615](#)
3. R. M. Blumenthal. *Excursions of Markov Processes*. Birkhäuser, Boston, 1992. [Math. Review MR1138461](#)
4. L. Chaumont and V. Rivero. On some transformations between positive self-similar Markov processes. Preprint, 2006. Math. Review number not available.
5. E. B. Dynkin. An application of flows to time shift and time reversal in stochastic processes. *Trans. Amer. Math. Soc.* 287 (1985), 613-619. [Math. Review MR768728](#)
6. P. J. Fitzsimmons. Homogeneous random measures and a weak order for the excessive measures of a Markov process. *Trans. Amer. Math. Soc.* 303 (1987), 431-478. [Math. Review MR902778](#)
7. P. J. Fitzsimmons. On the excursions of Markov processes in classical duality. *Probab. Theory Related Fields* 75 (1987), 159-178. [Math. Review MR885460](#)
8. P. J. Fitzsimmons. Markov processes with equal capacities. *J. Theoret. Probab.* 12 (1999), 271-292. [Math. Review MR1675005](#)
9. P. J. Fitzsimmons and R. K. Gettoor. Revuz measures and time changes. *Math. Z.* 199 (1988), 233-256. [Math. Review MR958650](#)
10. P.J. Fitzsimmons and R.K. Gettoor. Excursion theory revisited. *Illinois J. Math.* 50 (2006), 413-437. Math. Review number not available.
11. R. K. Gettoor. *Excessive measures*. Birkhäuser, Boston, 1990. [Math. Review MR1093669](#)
12. R. K. Gettoor and J. Glover. Constructing Markov processes with random times of birth and death. In *Seminar on stochastic processes, 1986*, pages 35-69. Birkhäuser, Boston, 1987. [Math. Review MR902426](#)
13. K. Itô. Poisson point processes attached to Markov processes. In *Proceedings of the Sixth Berkeley Symposium on Mathematical Statistics and Probability*, (Vol. III), pages 225-239. Univ. California Press, Berkeley, 1972. [Math. Review MR0402949](#)
14. H. Kaspi. Random time changes for processes with random birth and death. *Ann. Probab.* 16 (1988), 586-599. [Math. Review MR929064](#)
15. J. Lamperti. Semi-stable Markov processes, I. *Z. Wahrsch. verw. Gebiete* 22 (1972), 205-225. [Math. Review MR0307358](#)
16. B. Maisonneuve. Exit systems. *Ann. Probability* 3 (1975), 399-411. [Math. Review MR0400417](#)
17. J. B. Mitro. Dual Markov processes: construction of a useful auxiliary process. *Z. Wahrsch. Verw. Gebiete* 47 (1979), 139-156. [Math. Review MR523166](#)
18. V. Rivero. Recurrent extensions of self-similar Markov processes and Cramér's

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- condition. *Bernoulli* 11 (2005), 471-509. [Math. Review MR2146891](#)
19. V. Rivero. On recurrent extensions of positive self similar Markov processes and Cramér's condition II. Preprint, 2006. Math. Review number not available.
 20. T. S. Salisbury. On the Itô excursion process. *Probab. Theory Related Fields* 73 (1986), 319-350. [Math. Review MR859837](#)
 21. T. S. Salisbury. Construction of right processes from excursions. *Probab. Theory Related Fields* 73 (1986), 351-367. [Math. Review MR859838](#)
 22. J. Vuolle-Apiala. Itô excursion theory for self-similar Markov processes. *Ann. Probab.* 22 (1994), 546-565. [Math. Review MR1288123](#)
 23. J. Vuolle-Apiala and S. E. Graversen. Duality theory for self-similar processes. *Ann. Inst. H. Poincaré Probab. Statist.* 22 (1986), 323-332. [Math. Review MR871085](#)



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