

Pistorius, Martijn R.

An excursion-theoretical approach to some boundary crossing problems and the Skorokhod embedding for reflected Lévy processes. (English) [Zbl 1126.60039](#)

Donati-Martin, Catherine (ed.) et al., Séminaire de Probabilités XL. Berlin: Springer (ISBN 978-3-540-71188-9/pbk). Lecture Notes in Mathematics 1899, 287-307 (2007).

Summary: Let X be a spectrally negative Lévy process, reflect X at its supremum \bar{X} and call this process Y . Let τ_a denote the first time Y crosses the level a . Using excursion theory we solve the problem of *J. P. Lehoczky* [Ann. Probab. 5, 601–607 (1977; [Zbl 0367.60093](#))] or a spectrally negative Lévy process, that is, we express the joint law of $(\tau_a, \bar{X}_{\tau_a}, Y_{\tau_a-}, \Delta X_{\tau_a})$ in terms of so-called scale functions that also turn up in the solution of the two-sided exit problem, thereby extending results of *F. Avram, A. E. Kyprianou* and *M. R. Pistorius* [Ann. Appl. Probab. 14, No. 1, 215–238 (2004; [Zbl 1042.60023](#))], who solved for the joint law of (τ_a, Y_{τ_a}) . Next we obtain an explicit and non-randomised solution to the Skorokhod embedding problem of Y : we find a stopping time T such that $Y_T \sim \nu$ for a measure ν on $(0, \infty)$ without atoms.

For the entire collection see [\[Zbl 1116.60002\]](#).

MSC:

[60G51](#) Processes with independent increments; Lévy processes

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Keywords:

[problem of Lehoczky](#); [Skorokhod embedding](#)

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