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Explicit solutions for the exit problem for a class of Lévy processes. Applications to the pricing of double barrier options

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Lewis and Mordecki have computed the Wiener-Hopf factorization of a L\'evy process whose restriction on $]0,+\infty[$ of their L\'evy measure has a rational Laplace transform. That allows to compute the distribution of $(X_t,\inf_{0\leq s\leq t}X_s)$. For the same class of L\'evy processes, we compute the distribution of $(X_t,\inf_{0\leq s\leq t}X_s,\sup_{0\leq s\leq t} X_s)$ and also the behavior of this triple at certain stopping time, like the first exit time of an interval containing the origin. Some applications to the pricing of double barrier options with or without rebate are evocated.

Subjects: **Probability (math.PR)**; Computational Finance (q-fin.CP)

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