On the McKean optimal stopping game driven by a spectrally negative Lévy process

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Abstract. This talk is about joint work (in progress) with Erik Baurdoux from the LSE. We consider the McKean optimal stopping game (an extension to a game of the McKean optimal stopping problem, the latter also known as American put option) driven by a spectrally negative Lévy process X. In the perpetual case we extend earlier work by Erik Baurdoux and Andreas Kyprianou to further investigate the optimal strategy of the minimizer. In particular we show that when a Gaussian component is present, a threshold for the penalty parameter δ exists such that for δ larger than this threshold the minimizer should only stop when X hits the level $\log K$, while for δ smaller than this threshold the minimizer should stop when X enters the full interval $[\log K, y^*]$ (so $y^* > \log K$). We find an expression for y^* and deduce some properties of it as a function of δ.

We also discuss the finite expiry case. It is known from earlier work by Christoph Kühn and Andreas Kyprianou that when X is a Brownian motion, the minimizer should only exercise when X hits the level $\log K$ (and time-to-go is not smaller than some t^*). A numerical scheme shows that in a jump-diffusion setting an interesting phenomenon occurs: without Gaussian component the exercise region of the minimizer 'thickens' to a truly 2-dimensional region, while with a Gaussian component this 'thickening' only happens after some threshold that is strictly larger than t^*.

Keywords McKean optimal stopping game, spectrally negative Lévy process, Canadization.