

On a skew stable Lévy process

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The skew Brownian motion is a strong Markov process which behaves like a Brownian motion until hitting zero and exhibits an asymmetry at zero. We address the following question: what is a natural counterpart of the skew Brownian motion in the situation that an underlying Brownian motion is replaced with a stable Lévy process with finite mean and infinite variance. We define a skew stable Lévy process X as a limit of a sequence of stable Lévy processes which are perturbed at zero. We derive a formula for the resolvent of X and show that X is a solution to a stochastic differential equation with a local time. Also, we provide a representation of X in terms of Itô's excursion theory.

Funding: This work was supported by the National Research Foundation of Ukraine (project 2020.02/0014 'Asymptotic regimes of perturbed random walks: on the edge of modern and classical probability').

References

- [1] Iksanov, Alexander and Pilipenko, Andrey: *On a skew stable Lévy process*, Stochastic Processes and their Applications, 156, 44–68, (2023).