EXPONENTIAL STABILITY OF LINEAR LÉVY DRIVEN SYSTEMS

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We study the exponential stability of a linear system interpreted as a linear deterministic dynamical system distorted by Lévy noise. The exponential growth rates of such systems are described by Lyapunov exponents. We derive an expression for the Lyapunov exponents as phase-averages (expectations) over the projective space P^{d-1} of $\mathbf{R}^d$ which for systems driven by Brownian motion is known as the Furstenberg-Khasminskii fomula (e.g. [3]).

It has been discovered in [1] that for the lower exponents such averages contain a non-adapted component. In these cases we have to rely on anticipative techniques using Malliavin calculus (e.g. [2]).

References

[1] L. Arnold and P. Imkeller, *Furstenberg-Khasminskii Formulas for Lyapunov Exponents via Anticipative calculus.* Stochastic and Stochastic Reports, **54(1)** (1995) 127–168.

[2] Y. Ishikawa and H. Kunita, *Malliavin calculus on the Wiener-Poisson space and its application to canonical SDE with jumps.* Stochastic Processes and their Applications, **116(12)** (2006), 1743–1769.

[3] R. Z. Khasminskii, *Stochastic stability of differential equations.* Sijthoff and Noordhoff: Alphen (1980).