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Large and moderate deviation principles for McKean-Vlasov SDEs with jumps

We consider McKean-Vlasov stochastic differential equations (MVSDEs) driven by Lévy noise. By identifying the right equations satisfied by the solutions of the MVSDEs with shifted driving Lévy noise, we build up a framework to fully apply the weak convergence method to establish large and moderate deviation principles for MVSDEs. In the case of ordinary SDEs, the rate function is calculated by using the solutions of the corresponding skeleton equations simply replacing the noise by the elements of the Cameron-Martin space. It turns out that the correct rate function for MVSDEs is defined through the solutions of skeleton equations replacing the noise by smooth functions and replacing the distributions involved in the equation by the distribution of the solution of the corresponding deterministic equation (without the noise). This is somehow surprising. With this approach, we obtain large and moderate deviation principles for much wider classes of MVSDEs in comparison with the existing literature (see AAP 29(2019),1487-1540). This talk is based on joint work with Wei Liu, Yulin Song, and Tusheng Zhang.