

Title: Local asymptotic normality of jump-diffusion processes with discrete observations

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Abstract: When we try to show local asymptotic normality (LAN) of jump-diffusion processes with discrete observations, there are two problems. The first one is to control transition density ratios between two different values of the parameter. To solve this, we use the scheme with the so-called  $L^2$  regularity condition proposed by Jeganathan (Sankhya Ser. A 1982). The original scheme cannot be applied for jump-diffusion processes because of their fat-tailed behaviors. Therefore, we extend the scheme so that it can be applied to jump-diffusion processes. The second problem is that the transition probability for no jump is quite different to that for the presence of jumps. This fact makes it difficult to identify the asymptotic behavior of the likelihood function. To deal with this problem, we approximate the original likelihood function by using a thresholding likelihood function that detects existence of jumps. As a consequence of these techniques, we obtain LAN for jump-diffusion processes. Moreover, the quasi-maximum-likelihood and Bayes-type estimators proposed in Shimizu and Yoshida (Stat. Inference Stoch. Process. 2006) and Ogihara and Yoshida (Stat. Inference Stoch. Process. 2011) are shown to be asymptotically efficient in this model.

Keywords: asymptotically efficient estimation; jump-diffusion processes; local asymptotic normality; parametric inference; transition density approximation