Report on "STABLE CENTRAL LIMIT THEOREMS FOR SUPER ORNSTEIN-UHLENBECK PROCESSES, II"

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In this manuscript, the authors consider some asymptotic behavior for a class of supercritical super Ornstein-Uhlenbeck processes with branching mechanisms of infinite second moment. They establish the stable central limit theorems for all functions of polynomial growth, which improve their previous work (Elect. J. Probab. 24(2019), no. 141). The normal central limit theorems have been studied for some supercritical superprocesses with finite second moment,

It is, however, a pity that the branching mechanisms they deal with are not general enough(Assumption 2). In fact, under Assumption 2, the branching mechanisms in this paper has the form: $\psi(z) = -\alpha z + z^{1+\beta}(\eta + \epsilon(z))$, where $\eta > 0$ and $|\epsilon(z)| \leq C(z^2 + |z|^{1+\beta+\delta})$. I think, it is interesting, and of course more difficult, to consider the case that $\epsilon(z)$ is a general slowly varying function.

Other comments/suggestions:

(1) Page 3: In the definition of $m_t[f]$, since β is not an integer, then for complex number z, $z^{1+\beta}$ is not unique, give clearly definition of $z^{1+\beta}$.

(2) page 5:In Lemma 2.1, introduce the notation $\mathcal{P}^+$;

(3) page 6, Lemma 2.4: The same as above: define $x^{1+\beta}$, when x is negative.

(4) page 8: In the second line of (2.9), change '$T_u f$' into '$T_u f_s$'.

(5) page 8: In the first inequality below (2.9), the last part missed t^{-1}.

1. Page 4. line 1. I think that "$\alpha\tilde{\beta} \leq \kappa_f b$" should be "$\alpha\tilde{\beta} > \kappa_f b$".
2. Page 4, line 3. Correspondingly, "$\alpha\tilde{\beta} > \kappa_f b$" should be "$\alpha\tilde{\beta} \leq \kappa_f b$".
3. Page 9, line 15. " $=$ " should be " $:=$ ".
4. Page 10, line 16. The term $< f, \phi_p >_\varphi$ was missed.

References

[1] Y.-X. Ren, R. Song, Z. Sun and J. Zhao: Stable central limit theorems for super Ornstein-Uhlenbeck processes. *Elect. J Probab.*, **24(141)**, 1-42 (2019).