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Department of Statistics and Probability

COLLOQUIUM

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Limit theorems, scaling of moments and intermittency for integrated finite variance supOU processes

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10:20 AM - 11:10 AM

Refreshments 10:00 AM

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Abstract

Superpositions of Ornstein-Uhlenbeck type (supOU) processes provide a rich class of stationary stochastic processes for which the marginal distribution and the dependence structure may be modeled independently [1,2]. In this paper we investigate the limiting behavior of integrated supOU processes with finite variance[3,4,5,7] (see [7] for multifaced behaviour of supOU processes in the case the infinite variance).

We show that after suitable normalization four different limiting processes may arise. The type of limit depends on the decay of the correlation function as well as on the characteristic triplet of the marginal distribution. supOU processes, moreover, may exhibit intermittency, a phenomenon affecting the rate of growth of moments[3,4,5,6]. We establish this rate for each of the four limiting scenarios. The rate changes at some point indicating that there is a change-point in the asymptotic behavior of absolute moments. For such a behavior to be possible, the moments in the limit theorem do not converge beyond some critical point. We show that this point is related to the dependence structure of the supOU process. The intermittency phenomenon appears also in some other models, for example, in the subclass of ambit processes[2] known as trawl processes [5].

Joint work with D. Grahovac (Osijek University, Croatia), M. Taqqu (Boston University, USA) and A.Sikorskii (Michigan State University, USA).

References:

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- 2: Barndorff-Nielsen, O.E., Benth, F. E., Veraart, A. E.D.(2018) Ambit Stochastics, Springer.
- 3: Grahovac, D., Leonenko, N., Sikorskii, A., Tešnjak, I.(2016) Intermittency of superpositions of Ornstein-Uhlenbeck type processes, Journal of Statistical Physics, 165, 390-408
- 4: Grahovac, D. and Leonenko, N., Sikorskii, A. and Taqqu, M.S. (2018) The unusual properties of aggregated superpositions of Ornstein-Uhlenbeck type processes, Bernoulli, in press, <https://arxiv.org/pdf/1708.02178.pdf>
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- 6: Grahovac, D. and Leonenko, N. and Taqqu, M.S.(2018) Limit theorems, scaling of moments and intermittency for integrated finite variance supOU processes, submitted, <https://arxiv.org/abs/1711.09623>
- 7: Grahovac, D. and Leonenko, N. and Taqqu, M.S.(2018) The multifaced behaviour of supOU processes: the infinite variance case, submitted, <https://arxiv.org/abs/1806.09811>

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