



## On the law of the supremum of Lévy processes

Submitted by Emmanuel Lemoine on Thu, 12/05/2013 - 15:32

Titre On the law of the supremum of Lévy processes  
 Type de publication Article de revue  
 Auteur Chaumont, Loïc [1]  
 Pays Etats-Unis  
 Editeur Institute of Mathematical Statistics  
 Ville Hayward  
 Type Article scientifique dans une revue à comité de lecture  
 Année 2013  
 Langue Anglais  
 Date 2013/05  
 Numéro 3  
 Pagination 1191 - 1217  
 Volume 41  
 Titre de la revue Annals of Probability  
 ISSN 2168-894X

Résumé en anglais We show that the law of the overall supremum  $\overline{X}_t = \sup_{s \leq t} X_s$  of a Lévy process  $XX$ , before the deterministic time  $t$  is equivalent to the average occupation measure  $\mu_t(dx) = \int_0^t P(X_s \in dx) ds$ , whenever  $0$  is regular for both open halflines  $(-\infty, 0)$  and  $(0, \infty)$ . In this case,  $P(\overline{X}_t \in dx)$  is absolutely continuous for some (and hence for all)  $t > 0$  if and only if the resolvent measure of  $XX$  is absolutely continuous. We also study the cases where  $0$  is not regular for both halflines. Then we give absolute continuity criterions for the laws of  $(g_t, \overline{X}_t)$  and  $(g_t, \overline{X}_t, X_t)$ , where  $g_t$  is the time at which the supremum occurs before  $t$ . The proofs of these results use an expression of the joint law  $P(g_t \in ds, X_t \in dx, \overline{X}_t \in dy)$  in terms of the entrance law of the excursion measure of the reflected process at the supremum and that of the reflected process at the infimum. As an application, this law is made (partly) explicit in some particular instances.

URL de la notice <http://okina.univ-angers.fr/publications/ua94> [2]  
 DOI 10.1214/11-AOP708 [3]  
 Lien vers le document <http://hal.archives-ouvertes.fr/hal-00537222> [4]

### Liens

[1] <http://okina.univ-angers.fr/l.chaumont/publications>

[2] <http://okina.univ-angers.fr/publications/ua94>

[3] <http://dx.doi.org/10.1214/11-AOP708>

[4] <http://hal.archives-ouvertes.fr/hal-00537222>

Publié sur *Okina* (<http://okina.univ-angers.fr>)