Post-Doc position in Mathematical Statistics

in the research ANR project "MCLAREN" (ANR-20-CE23-0011)

Laboratoire J.A. Dieudonné, UMR CNRS 7351, Université Côte d'Azur, Nice.

This Post-doc scholarship is devoted to investigate an open statistical problems in the multivariate risk measures and extreme value theory with applications in functional statistics.

Duration
18 months, position beginning as soon as possible after February 1, 2021.
Gross revenue monthly 2981,72 €, net before tax 2396,40 €

Require qualification
PhD in Mathematical Statistics

Required skills
Several skills are required as

- A solid background in multivariate probability and multivariate statistic theory,

- Possible knowledge in extreme value theory,

- A good knowledge in programming languages (as R, C++ or Matlab).

Goals
During this post-doc position, we aim to study some multivariate extensions of risk measure as for instance multivariate Expectiles when some covariate information is available. Preliminary studies in this sense can be found in Maume-Deschamps et al. (2017, 2018), Beck et al. (2020).

We aim to adapt the univariate well known conditional expectile/quantile model (see, *e.g.*, Daouia et al. (2013), Usseglio-Carleve (2018), Girard et al. (2019)) to our estimation problem for new conditional multidimensional risk measure in the heavy-tailed framework with functional covariate information. In particular we will use extrapolation technique when the risk level $\alpha \to 1$ together with some non-parametric estimation procedures of the conditional tail copula (see, *e.g.*, Gardes and Girard (2015)).

The interested reader is also referred for instance to Gardes et al. (2010), Gardes and Stupfler (2019) where functional non-parametric estimators for conditional univariate extreme quantiles are proposed.

The main objective of this approach for extreme functional multivariate risk measures would be to balance the trade-off between the high sensitivity to dimension of full nonparametric models and the relative lack of flexibility of the completely parametric models (see, *e.g.*, Goia and Vieu (2016)). Since the considered covariate belongs to a not necessarily finite-dimensional Polish space endowed with a semi-metric, this work will open interesting perspectives in functional statistics field.

The selected student will be co-supervised by Thomas Laloë and Elena Di Bernardino, with an office at Laboratoire J.A. Dieudonné, Université Côte d'Azur in Nice. This scholarship of 18 months is financed by the ANR projet "MCLAREN" (ANR-20-CE23-0011).

Contacts for candidature

Contacts to apply via mail:
Thomas Laloë, laloe@unice.fr
Maître de Conférences - HDR
Elena Di Bernardino, elenadb@unice.fr
Professeure des Universités

Laboratoire J.A. Dieudonné, UMR CNRS 7351, Université Côte d'Azur, Parc Valrose, 06108 Nice, Cedex 2, France.

Needed documents:

- PhD or equivalent diploma

- Cover letter

- Detailed curriculum vitae with research summary

- Copy(s) of the diploma(s)

- Thesis defense report

- The name and contact of a person for recommendation

References

Beck, N., Di Bernardino, E., Mailhot, M., 2020. Semi-parametric estimation of multivariate extreme expectiles. Preprint .

Daouia, A., Gardes, L., Girard, S., 2013. On kernel smoothing for extremal quantile regression. Bernoulli 19, 2557–2589. doi:10.3150/12-BEJ466.

Gardes, L., Girard, S., 2015. Nonparametric estimation of the conditional tail copula. Journal of Multivariate Analysis 137, 1–16. doi:10.1016/j.jmva.2015.01.01.

Gardes, L., Girard, S., Lekina, A., 2010. Functional nonparametric estimation of conditional extreme quantiles. Journal of Multivariate Analysis 101, 419 – 433. doi:https://doi.org/10.1016/j.jmva.2009.06.007. statistical Methods and Problems in Infinite-dimensional Spaces.

Gardes, L., Stupfler, G., 2019. An integrated functional Weissman estimator for conditional extreme quantiles. REVSTAT - Statistical Journal 17(1), 109–144.

Girard, S., Stupfler, G., Usseglio-Carleve, A., 2019. Nonparametric extreme conditional expectile estimation. URL: https://hal.archives-ouvertes.fr/hal-02114255. preprint.

Goia, A., Vieu, P., 2016. An introduction to recent advances in high/infinite dimensional statistics. Journal of Multivariate Analysis 146, 1 – 6. doi:https://doi.org/10.1016/j.jmva.2015.12.001. special Issue on Statistical Models and Methods for High or Infinite Dimensional Spaces.

Maume-Deschamps, V., Rullière, D., Said, K., 2017. Multivariate extensions of expectiles risk measures. Dependence Modeling 5, 20–44.

Maume-Deschamps, V., Rullière, D., Said, K., 2018. Extremes for multivariate expectiles. Statistics & Risk Modeling 35, 111–140.

Usseglio-Carleve, A., 2018. Estimation of conditional extreme risk measures from heavy-tailed elliptical random vectors. Electron. J. Statist. 12, 4057–4093. doi:10.1214/18-EJS1499.