

Report on the research stay at BTU Cottbus Senftenberg

Prof. Takam Soh Patrice, Dept. of Mathematics, University of Yaoundé I

- **Summary statement of major outcome**

The research stay allowed us to do a literature review on the estimation methods of nonlinear regression models. At the end of this literature review, we were able to identify some research questions mainly concerning: (i) the construction of an estimator of the link function in a panel model, taking into account the time effect by assuming time dependence, (ii) Extend a previous work in the case where the covariates are of different nature (continuous and categorical variables) and (iii) propose a statistical test in order to decide if the obtained link function is close to a certain link function known in the literature.

- **Brief description of research activities during the research visit**

In terms of research activities, there were

- personal work that consisted in reading several articles (understand the main idea and some technical proofs) in order to elaborate the literature reviews on the main research question;
- participation in the weekly research seminars with local and international audience (www.b-tu.de/fg-wirtschaftsmathematik/forschung/forschungsseminar-stochastik);
- two talks I have given (one in overviews in nonparametric regression and one on my research result);
- exchanges with other researchers of the laboratory;
- exchanges with some Phd students in their thesis work;
- participation in a block course (maximum principle in stochastic optimal control) given by a guest lecturer
- writing the technical report

- **Students and post-doctoral fellows advised**

During my stay in Cottbus, I spent some time to discuss with Florent Wabo Kamkumo on his Phd thesis (a student I am co-supervising with Prof. Ralf Wunderlich) in order to be able to contribute efficiently to the second part of his work on parameter estimation. I have already given him a list of the points (tasks) he has to work on and I will follow this part from Cameroon (we will exchange via email or zoom).

- **Joint activities with the host**

The first work we have in common is the one defined above with the student who is in progress at the moment. And we can also talk about a second one which is still in project. Indeed, at the end of my stay, we agreed to obtain climatic data for at least 5 years in Cameroon in order to make the projections on production rates that we will propose more reliable.

- **Research in progress (as a result from the visit)**

We are now working on the construction of an estimator of the link function in a panel model, taking into account the time effect by assuming time dependence.

- **Papers published or in preprint form as a result from the research visit:** Not yet but work is in progress

- **Planned future activities as a result of the research visit:** Not yet but work is in progress

Three projects are planned at the end of this stay

- A Phd thesis on the nonparametric change point detection in time series.
- A Master's thesis on the nonparametric estimation of the instantaneous risk according to the climate change. The idea here is to replace the exponential function in the Cox model by any function.
- A Master's thesis on the construction of a statistical test in order to test whether the link function is equal to a known or suspected link function.

Students will begin working on these topics next September, for the 2022-2023 academic year.