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Motivation

- Some ten years ago Department of Mathematics (in collaboration with Faculty of Economics) at University of Ljubljana started a programme in Mathematics of Finance (Financial Mathematics) on both first and second Bologna level.

- The idea was that some of the courses would be covered by people coming from other universities mostly from neighboring countries (s.a. Italy, Croatia, Hungary and Austria)

- We would also be sending PhD students abroad.

Motivation continued

- However, the temporary solutions could not start the true building of the field.

- Obtaining some people able to teach courses in the graduate programme on a very short notice is fine.

- But we also need to create a viable research atmosphere in financial mathematics and relat-ed fields, which is a necessary prerequisite for the long term success of the programme.

- The solution is to start long-term cooperation with universities where this filed is flourishing.

Eidgenössische Technische Hochschule Zürich

- A PhD student in M.F. from Ljubljana finished at Zürich even before we started the programme, but he did not come home after the study here and a postdoc position in the States.

- One person from Ljubljana who already had a teaching position there came to do a Master in M.F. here. He is now an excellent teacher in the area but his research is based in his previous field.

- A new approach was tested with Professor Josef Teichmann and SCIEX.

The first SCIEX Fellow

- Dejan Velušček became our first SCIEX Fellow, i.e. working with Josef Teichmann as the Host Mentor and me as a Home Mentor.

- During this project he got a lot of knowledge and brought this knowledge home where he is transferring it to younger generations.

- Next week his first PhD student in the area of Mathematics of Finance is having her defense in Ljubljana. This is another proof that we all did a good job.

My involvement with the first Fellow

- Prof. Teichmann and Dr. Velušček were working on numerical approximation of solution processes of SDEs. They extended Fujiwara's method which may be viewed as a variant of Richardson extrapolation, which allows one to reach high orders with few extrapolation steps.

- A very interesting method what they developed which I was able to follow easily but was not interested enough to be really contributing to their work.

The door of the ETH lab opened

- However, my visits to Zürich, enabled by the SCIEX grant, opened the door of Josef Teichmann's laboratory at ETH to me.

- I was able to discuss possible future cooperation with him, but also with his students and postdocs which opened to me a variety of interesting problems.

- So we found the next problem – is the generator of a one-parameter semigroup of endomorphims of a symmetric cone C, always the sum of a Lie group generator and an endomorphism of C?

The second SCIEX Fellow

- Klemen Šivic became the second SCIEX Fellow of Josef Teichmann and myself.

- He was somewhat less involved with trying to learn everything there is to learn.

- However, he was much more involved with trying to solve the problem we gave him. And, it turned out that it was a really hard one.

- Actually, the problem, proposed a few years ago in the theory of affine processes had an equivalent formulation in functional analysis open much longer.

Combined evaluation of the SCIEX projects

- We have established a strong connection in the M.F. network that includes on Ljubljana side two teachers / researchers on a much higher level than before.

- Through this cooperation we have established some other connections that did not exist before.

- Both Fellows have also matured their research capacities.

- The cooperation has brought some interesting and even some deep results proving that a step in scientific progress and innovation has been made.

Published results

- *Kojiro Oshima, Josef Teichmann, and Dejan Velušček*: A new extrapolation method for weak approximation schemes with applications, *Ann. Appl. Probab., Volume 22, (2012), pp. 1008-1045.*

- *Bojan Kuzma, Matjaž Omladič, Klemen Šivic, and Josef Teichmann*: Exotic one-parameter semigroups of endomorphisms of a symmetric cone, *Linear Algebra and its Applications, Volume 477, (2015), pp. 42-75.*