Scientific report

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February 13 – 19, 2012

1. **Purpose of the visit:**

The main purpose of my visit to CEA in Paris was to exploit opportunities for using methods of stochastic algebraic topology (developed by my collaborators and myself) in problems of distributed computing which are being investigated in the laboratory of CEA (Ecole Polytechnique) lead by Professor Eric Goubault. We also intended to prepare an application for a DIGITEO grant. This was a first visit between us; its purpose was mainly to exploit future opportunities.

2. **Description of the work carried out during the visit:**

During the visit we had many face to face discussions with Professor Goubault and members of his team. We discussed the two different topological reductions of problems of distributed computing to topological problems: (a) the theory of trace spaces and (b) the protocol complexes of Herlihy and Shavit. Both these topological reductions are complete although in the case of protocol complexes the obtained topological problem is more amenable to standard tools of algebraic topology. I gave a talk at a seminar in CEA. Besides, I visited INRIA (a research institution in Paris, located also in Saclay) and met Professor F. Chazal who is involved in research on topological data analysis – very close to the field of my interests.

3. **Description of the main results obtained:**

We succeeded in finding common research interest in using tools of stochastic algebraic topology in problems of distributed computing. We finalised details of the grant application and involvement of various partners. In particular, Professor Chazal will also join the application.

4. **Future collaboration with host institution:**

We plan to continue our collaboration communicating in the meantime via the email and phone. The main goal is to find an approach to model mathematically situations when a large number of processors are involved in a computation. We want to find a typical behaviour of large protocols under various probabilistic assumptions (the number of processors, the number of loops, reliability information etc).

5. **Projected publications/articles resulting or to result from the grant.**

No publications are planned at this stage.

6. Other comments

Originally my visit was planned to last longer, until February 23, 2012. However for health urgent reasons I had to cut short my visit; the actual dates were 13.2.2012 – 19.2.2012.