ACAT Short Visit 5579 and 5582

Purpose of the visit

The aim of the visit of Fajstrup and Raussen to the CEA lab at Gif-sur-Yvette (France) was to report on recent work, to exchange ideas for future collaboration and to discuss and lay out plans for a book, "Directed algebraic Topology and concurrency", to be co-authored by members of the French and of the Danish group.

Description of the work carried out during the visit

Every day of the visit started with reports on recent and ongoing work and a subsequent discussion. Afternoons were mainly used to develop detailed plans for the contents of the book mentioned above, and partially also for developing the structure of a week-long summer school to be held in 2014.

Description of the main results obtained

- Fajstrup presented recent work: Two cut-off theorems, one for deadlocks in PV-programs with higher order semaphores and one on serializability of PV-programs with mutexes. Subsequent discussion resulted in new angles for the presentation of the results and also in ideas for future work on cut-off results in the PV-setting.
- Raussen presented recent work with K. Ziemiańsky on a closed form computation of the homology of spaces of directed paths in a particular setting and sketched possible extensions of this result.
- Heindel talked about connections between classical partial order reduction results in concurrency theory and relations to the geometric perspective.
- Goubault gave hints to promising applications of CAT(0)-technology (e.g. from geometric group theory) to the description and analysis of configurations in geometric concurrency theory.
- A general plan for the book has been established, including a tentative table of content, the distribution of the work among several authors, and the set-up of an SVN-site.
- We agreed on the overall structure of a "summer" school to be co-organized by members of the group in Lyon in January 2014.

Future collaboration with host institution

There is and has been ongoing collaboration between the two groups from Aalborg and CEA/Ecole Polytechnique for many years. The ACAT grant has made it possible to strengthen the contacts that certainly will continue intensively during the preparation of the book under development.

Projected publications/articles resulting or to result from your grant

- A journal paper or a conference contribution on the cut-off theorems by Fajstrup is under preparation.
- As a result of the meeting, we have now concrete and detailed plans for the book "Directed algebraic Topology and concurrency" that we hope to deliver by the end of 2014.