REPORT ON ACTIVITIES CARRIED OUT AT THE CATHOLIC UNIVERSITY OF LOUVAIN, LOUVAIN-LA-NEUVE, BELGIUM.

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I carried out a research visit at the Research Institute in Mathematics and Physics at the Catholic University of Louvain from 17 January to 15 February December 2020 in collaboration with Prof Pascal Lambrechs. During this period, I familiarized myself with the theory of operads with the goal to apply to (co)homology theories of algebras over operads.

During the first two weeks, we went through some topological and algebraic operads, such as Associative, Commutative and Poisson operads and the little disk operad. We then proceeded to the free operad over a symmetric monad and the presentation of some quadratic operads.

During the last two weeks, we worked on the (co)homology of operads which is quite involving so it remains to apply the theory the the Poisson and Gerstenhaber operads in order to get results on homology theory of Gerstenhaber and Poisson algebras.

In the margin, I worked with Prof (emeritus) Yves Félix on free loop spaces arising from embeddings of smooth manifolds. Some properties of the induced maps where obtained in the induced Hochschild cohomologies. A paper was written and it remains to be edited for submission for publication. The title of the paper is *Hochschild cohomology of Sullivan algebras and mapping spaces between manifolds*.

I would like to thank the IMU for the research award and the Catholic University of Louvain (Louvain-la-Neuve) for hosting me. I am particularly grateful to Prof Pascal Lambrechts and Prof Yves Félix for useful discussions.

Jean-Baptiste Gatsinzi,
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