

Research Report of the visit

(17 June 2017 to 07 July 2017)

In the first week, I attended the TACL school <http://www.cs.cas.cz/tacl2017/> held at Palacky University Olomouc. The school comprised of 4-lecture series covering topics in logic and category theory. The lectures by Martin Goldstern were on clones on finite sets. Jiri Velebil and Steve Vickers gave lectures on category theory covering adjunctions, monads, Kleisli and Eilenberg-Moore category, Grothendieck topos and sheaf theory. Tamaso Moraschini gave talks on abstract algebraic logic, which is the study of consequence relations. He has also worked on translations of logics and has given a correspondence between adjunctions and translations [1]. I am currently interested in translations of ‘Intuitionistic logic with minimal negation (ILM)’ into other propositional logics, which I have used in my recent works [2] [3]. I had a discussion with him related to this area.

In the second week, I attended the TACL conference held at Charles University Prague. The conference had number of talks on logics, category theory and point-free topology. I gave a talk entitled ‘*Topos and Quasitopos of Rough Sets*’. Further there were few invited talks, out of which I found two of them very interesting: (1) Effectus Theory [4] by Bart Jacobs, in which he defined a new type of category to study categorical logic for quantum logic. (2) Category of classical proofs [5] by Greg Restall, in which he defined a category of proof terms.

In the third week, I attended International Joint Conference on Rough Sets (IJCRS) 2017 (<http://ijcrs2017.uwm.edu.pl/>) held at University of Warmia and Mazury, Olsztyn, Poland. I gave a talk entitled ‘*A new algebra and logic from a category of rough sets*’, and got positive feedbacks from people working in rough sets. The conference covered the talks on foundations and applications of rough sets, and was attended by rough set theorists around the world. Prof. Polkowski (my host) gave a talk on foundations of mereology, and its application in granular computing and rough sets based data analysis. His works can be helpful in finding the examples of ‘monoid actions of rough sets’ [2]. I had discussions with Prof. Tamás Mihálydeák from University of Debrecen, Hungary on the concept of granularity in rough sets [6]. The algebra defined in my work may not satisfy law of excluded middle. If we define the granules and the approximation spaces in a suitable way, we may obtain some practical examples of such algebras.

References

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- [4] Jacobs, B.: New Directions in Categorical Logic, for Classical, Probabilistic and Quantum Logic. In: Logical Methods in Computer Science 11(3), pp. 1 – 76, Oct. 2015.
- [5] Restall, G.: Proof terms for classical derivations. <http://consequently.org/papers/proof-terms.pdf>
- [6] Ciucci, D., Mihálydeák, T. and Csajbók, Z.R.: On exactness, definability and vagueness in partial approximation spaces. Technical Sciences 18(3) : 203 – 212, 2015.