

Report on academic achievements, 2017

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I am a fourth year undergraduate student at the HSE Faculty of Mathematics. My academic supervisor is Alexey Gorodentsev.

I made two talks on the "Variety seminar" of Sergey Galkin and Christopher Brav: the first was Introduction to Atiyah classes following original paper of Michael Atiyah "Complex analytic connections in fibre bundles", and the second one was about tangent Lie algebras of algebraic varieties following paper of Nikita Markaryan "The Atiyah class, Hochschild cohomology and the Riemann-Roch theorem". Also I made a talk on the seminar "Main Spectral Sequences" conducted by Alexey Gorinov. It was about the classification of oriented cobordisms - rather classical topic.

We have a closed weekly seminar with Gorodentsev and another his student. We are trying find a categorification of characteristic classes especially Chern and Atiyah classes to put them into a broader context. On the way to it we want to give definitions of Kahler differentials or cotangent complex in some axiomatic way, so that it would make sense and such objects or functors would exist in arbitrary sufficiently nice triangulated categories and enjoy some good properties. Our primary motivations include aforementioned paper of Markaryan, some papers of B. Keller about Hochschild cohomology and some especially nice formulas for Lie algebras stated in the book of C. Reutenauer "Free Lie algebras". Our aim is to understand anything because right now we have nothing but vague ideas of what we could point at. The most basic definitions are not clear yet, and we still do not know when are they supposed to work and what do we mean for the category to be nice.

I also participated in a written IUM entering exam for graduate students. I even got a good result. However, provided much unclarity with my research project, I decided that it is better to take some time to think and enrol with more or less solid ideas of what I am going to do.