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Report on

The doctoral thesis
MODULI SPACES OF LIE ALGEBROID CONNECTIONS
by **Mgr. Libor Křižka**

This thesis is about Lie algebroids and in particular about Lie algebroid connections. Since this is a topic which is not part of main stream differential geometry the thesis has a long introductory chapter with many examples. After a general introduction the first chapter introduces the topic of Lie algebroids in general as well as some related topics such as Courant algebroids and Generalized Complex structures. The chapter contains many interesting examples as well as interesting material concerning things not directly related to the main topic of the thesis which shows that the author has acquired an overview of the field. This is very nice to see since there is a risk that, when one is working on a PhD, one becomes too narrow and focussed on just one thing. The second chapter is about Lie algebroid connections on vector bundles. It can be seen as a warm-up exercise for the principle bundle connections of chapter 3. Here the algebroidic approach to connections is introduced and various moduli spaces defined and their general structure and properties investigated. The third chapter is about Lie algebroid connections on principle bundles. It essentially follows the outline of chapter two but for principle bundles instead of vector bundles.

1) The bracket which is called the Courant bracket on page 17 is sometimes called the Dorfman bracket while the antisymmetrized version is called the Courant bracket. Since I am myself confused by this I would be interested to hear the authors opinion about which notation to use.

2) There are many nice examples of Lie algebroids in the first chapter but in

chapter two and three there are almost no examples of Lie algebroid connections. The only one I can find is the case when the algebroid is TM for which one gets back the usual definition. I would have liked more examples here. There seems to be a nice one in [10] where the algebroid is T^*M.

3) On page 28 the notation $\mathcal{A}^*(E, L)$ is used without defining what $*$ means.

4) I found it quite difficult to understand what part of the thesis should be attributed to the author and what part is taken from other persons. I would like to hear a discussion of what material in the thesis is original and what is not as well as the authors opinion about which of his results is most significant.

5) The "Conclusion" in the end does not contain much of a conclusion. A more proper title would be "Outlook" or something of that sort.

The thesis fulfils all the requirements for a PhD thesis and I recommend that it is accepted.

Rikard von Unge