Guidelines for graduation theses supervised by Stephan Huckemann

Students who have demonstrated that they can represent the field of mathematics with scientific quality at bachelor's or master's level are awarded a corresponding degree in mathematics in Göttingen.

1) Their theses are written ***under supervision*** within a specified time period in such a way that the students concerned, or fellow students in other mathematical areas at comparable level, can **well follow** the thesis without the specified literature, at that level they had achieved before dealing with the topic.

2) Students use the ***mathematical language game*** of definition, lemma, proof, theorem, remark, example, algorithm, etc. and show they can use it proficiently.

3) All terms and assumptions are ***carefully*** explained and introduced. Formulae contain no unclear terms, in particular all integration areas or areas over which indices run are listed.

4) At least one ***complex mathematical argument***, ideally a proof, is carefully derived including intermediate steps.

5) All not genuine ideas are carefully attributed to the ***literature***. Anything that is not thus identified will be viewed as own independent research and may be disqualified as plagiarism.

6) Students do not simply copy definitions and proofs from the literature, but first internalize them and then reproduce them ***independently structured***. Errors in the literature are found and corrected (many publications contain errors, often only typos, but sometimes of a more serious nature), or structures that are too complicated are simplified, especially those that are too general for the topic of concern.

7) A thesis that also deals with evaluations of data, analyzes them ***transparently*** and ***critically***. Among others, it carefully preprocesses them according to the state of the art and formulates and carefully checks models and assumptions. It provides all data and created program code, both ***well documented*** and easy to use for others.

8) In all of the above points, students show that they have well acquired mathematical thinking wich is characterized by ***brevity***, ***conciseness*** and ***precision***, as well as by ***simplicity*** and ***beauty*** and, in particular, avoids redundancy through ***abstraction***. Another characteristic is the ***caution*** to abstain from claims that cannot be proven. Except in well-founded cases, the ***mathematical rule of thumb*** applies: students do not believe anything whose proof they have not understood.

Points 2) and 4) are necessary, if one of the two is missing or if one is poorly addressed, the thesis cannot be accepted or is considered failed.

The grade is based on how well Points 1) – 8) have been realized. In particular, ***original thinking***, e.g. statements of known results in a new way, new applications of known results to problems in the applications - also with the development of new program packages, or the derivation of completely new results, as well as the degree of ***independent work*** are critical factors for the evaluation.

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