Second Exam Assessment - Mathematics

March 8, 2015

Second Exam Learning Goals

The Second Exam is an oral examination, taken before a committee of three mathematics
doctoral faculty members, and is ordinarily chaired by the student’s advisor. In format,
the examination consists of a formal presentation, generally one to two hours in length, of
a part of mathematics of contemporary relevance. Additionally, the topic should generally
be one whose mastery will facilitate the student’s work towards an eventual Ph.D. degree.
Specifically, the subject should be one in which the student has demonstrated aptitude and
interest, and has secured the guidance of a member of the faculty who is both knowledgeable
in the area and interested in taking on a Ph.D. level advisement role with the student.
Passage of the exam requires that the student be capable of putting together and delivering
a clear and coherent exposition of a high-level topic in mathematics, and be able to clarify
various points, and to answer pertinent questions from a knowledgeable audience that can
span any part of the broader research area. The student’s preparation for the exam is
ordinarily formed from a combination of relevant prior course and seminar work, individual
reading and study, and consultations with appropriate members of the faculty, as well as
with other students.

Assessment

In October 2012 a committee was formed to assess the introductory courses and the first
and second exams. Students and faculty were interviewed, the committee met in person and
conducted discussions by email.

On the subject of the second exam, the committee felt that the second exam works well.
However, the format of the second exam allows for some variation and so the committee
decided to describe a good second exam as a reference point. So, while no formal changes
are recommended, the department intends to rewrite the description of the second exam to
help ensure that the learning goals are achieved. A description of a good second exam can
help clarify the preparation the student must undertake and can help the faculty on the
examination committee measure the student’s mastery efficiently and effectively.
**Current Description of Second Exam**

After passing the First Examination, the student specializes in some area of advanced mathematics. A faculty committee will be appointed to help the student arrange a program of study in an area of special interest. When this program of study is completed, the student takes an oral examination given by the faculty to determine readiness to pursue dissertation research.

**Proposed Description of Second Exam**

The Second Exam is an oral examination, taken before a committee of three mathematics doctoral faculty members and is ordinarily chaired by the student’s advisor. In format, the examination consists of a formal presentation, generally one to two hours in length, of a part of mathematics of contemporary relevance. Additionally the topic should generally be one whose mastery will facilitate the student’s work towards an eventual Ph.D. degree. Specifically, the subject should be one in which the student has demonstrated aptitude and interest, and has secured the guidance of a member of the faculty who is both knowledgeable in the area and interested in taking on a Ph.D. level advisement role with the student.

The student, together with the advisor, should assemble a detailed outline of the planned presentation, including references, and make it available to the examination committee so that the committee can prepare questions. Sometimes this outline will include several minor topics in addition to the major topic and specific questions about basic material or about the broader research area are common. The presentation is usually a public event, although it may be conducted privately. The student should be prepared to give a chalk-talk as many examining committees will not allow a computer presentation. Notes are usually permitted, but the committee will notice if they are consulted too frequently. Students are encouraged to practice the presentation at one of the student seminars.

The student’s performance on the exam is evaluated by the exam committee immediately following the exam. The result is “pass,” “fail,” or “high-pass” if the student has done exceptionally well. The result is communicated to the student and the Executive Officer after a determination has been made. In the case of a fail, the student is directed to have a conference with the Executive Officer to discuss suitability of continuation, prospects for alternative fields of study, or in exceptional circumstances, the possibility of retaking the second exam in the same field.