

**Minutes of the Second Meeting of the
Directors of Studies in Mathematics
for 2007/08**

**Held on Tuesday 29th April 2008 at 11.15am
in the Lloyd Room, Christ's College**

Present: Kostya Feldman (Christ's), Robert Hunt (Christ's, Chairman), Christopher Tout (Churchill), Maciej Dunajski (Clare), Christopher Brookes (Corpus Christi & St Edmund's), Sophia Demoulini (Downing), Adriana Pesci (Downing), Rachel Camina (Fitzwilliam), Ross Lawther (Girton), Ruth Williams (Girton), Jonathan Evans (Gonville & Caius), Simon Wadsley (Homerton), Stephen Siklos (Jesus), Keith Carne (King's), Orsola Rath Spivack (Lucy Cavendish), Stuart Martin (Magdalene), Jonathan Dawes (Newnham), Dennis Barden (Pembroke), Nilanjana Datta (Pembroke), Julia Gog (Queens'), Jim McElwaine (St Catharine's), Matthias Dörrzapf (St John's), Richard Samworth (St John's), Jack Button (Selwyn), Nikos Nikiforakis (Selwyn), Julius Ross (Sidney Sussex), Laurent Storoni (Sidney Sussex), Imre Leader (Trinity), John Lister (Trinity), Hugh Osborn (Trinity), Tom Körner (Trinity Hall) and Tadashi Tokieda (Trinity Hall)

1. Apologies

Apologies were received from Mark Spivack (Emmanuel), Ivan Smith (Gonville & Caius) and Irena Borzym (St Catharine's).

2. Minutes of the meeting held on 13th November 2007

The minutes were accepted after the name of Jonathan Dawes (Newnham) had been added to the list of those present.

3. Matters arising

There were no matters arising not already listed on the agenda.

4. Part III funding

Professor Körner gave an update on the current situation for the future of Part III funding.

In the short term, students who intend to take Part III with LEA funding should not graduate at the end of Part II (although Scottish students would not be affected). There are other graduation ceremonies that students can attend if it turns out that they are not accepted for Part III.

In the longer term, a committee from the Faculty of Mathematics is currently negotiating with the University central bodies. The probable outcome is that an M.Math. degree will be created, along similar lines to the M.Sci. offered by Part III Physics. An M.Res. option will probably also be set up for students wishing to take a two-year course.

There are still many matters of detail to be decided. Professor Körner was asked whether there would be a formal "hurdle" set by the Faculty that students would need to clear in order to be admitted to Part III, but he thought this unlikely. He was also asked whether the M.Math. might be awarded retrospectively to those who have passed Part III in the past, but this was still under discussion.

5. Review of recent and forthcoming changes to the Tripod

The draft report from the Curriculum Committee was received. Each course was then discussed individually.

Mechanics

The introductory text and draft schedule were received. It was noted that the material in this non-examinable course was, effectively, a pre-requisite for the *Dynamics and Relativity* course, and that some statement to this effect might be included.

Dynamics and Relativity

The draft schedule was received. It was suggested that "Examples of forces, including gravity, friction and Lorentz" should be replaced by "Forces, including gravity, friction and Lorentz, with applications".

Variational Principles

The draft schedule was received and welcomed. This course might be considered compulsory (in some sense) for students who wished to study applied courses later in the Tripos. It was noted that the material on stationary points of functions was revision of material from *Differential Equations*. The reading list was felt to need further consideration: Evans was too advanced even to be listed as further reading, and Arfken should be added. Riley, Hobson & Bence should also be considered (though it might not cover the whole course). Both Arfken and Gelfand & Fomin could be "dagged". The prices listed did not seem realistic.

Vector Calculus

The minor change (statement of Maxwell's equations) was accepted.

Methods

The draft schedule was received. The method of separation of variables in spherical polar coordinates should be restricted to axisymmetric solutions. The section on Fourier transforms is difficult to teach because it comes before students have taken *Complex Methods/Analysis*: at this stage inverse transforms can only be performed by spotting standard results. It is therefore important that the lecturer does not assume too much knowledge during the section on PDEs.

Numerical Analysis

The draft schedule was received. The suggestion that the course should be given in Lent, rather than Easter as at present, was not well received: only 3 of those present voted for Lent, with the overwhelming majority voting that it remain in Easter with consideration given to more radical changes in the future. It was suggested that students should be encouraged to take *Variational Principles* and *Metric & Topological Spaces* in Easter Term of Part IA and *Numerical Analysis* and *Optimisation* in Part IB.

In Lent Term of Part IB, students are likely to choose 4 or 5 of the various courses on offer. If *Numerical Analysis* were to be one of a total of seven offered then students would have to over-specialise at an uncomfortably early stage. Many Directors of Studies thought that, for maximal educational benefit, the material in the existing Part IB course should be redistributed amongst other courses in both Part IA and Part IB, and that *Numerical Analysis* should then be taught as a *stand-alone* course only at Part II level.

Exploring the issue of possible redistribution, it was suggested that the material in *Numerical Analysis* tends to split into theoretical and practical issues, although there is strong overlap. The practical issues should become part of CATAM, and taken

seriously in that course; the theoretical issues would sit well within existing courses such as *Differential Equations, Vectors & Matrices* and *Linear Algebra*.

Regardless of the decision taken on this particular course, it was notable that the Lent Term of Part IB will, next year, contain almost entirely 16-lecture courses. The removal of *Special Relativity* from Part IB will mean that it can no longer be supervised together with *Quantum Mechanics* as, effectively, a 24-lecture course. Because 16-lecture courses are lectured only twice per week, it is very difficult to arrange supervisions effectively, and the majority of Directors of Studies voted that at least one course should, as an experiment, be lectured three times per week for the first two-thirds of Lent Term 2009.

Groups

The Curriculum Committee had suggested no change to this course at present, and this suggestion was agreed.

Analysis I

The suggestion to add the General Principle of Convergence to the schedule was agreed.

Algebraic Geometry

It was likely that a new Part II course on *Algebraic Geometry* would be recommended to the Faculty. However, the Curriculum Committee had not yet considered this proposal and no agreed draft schedule was available. There was some concern about the availability of suitable supervisors for the course.

6. Admissions

Undergraduate admissions statistics: state school and gender issues

Statistics from the *Reporter* were received. Dr Siklos pointed out that, on the face of it, there were some features of concern regarding success rates for mathematics applicants from maintained schools in comparison to those for other subjects, and also regarding success rates for female applicants for mathematics. Several issues would be important in understanding the figures, including numbers taking Further Mathematics and the fact that the offer/acceptance ratio in mathematics differs substantially from other subjects. A useful discussion took place but it was clear that further data on offers and other information would need to be collected for the next meeting before an informed debate were possible.

Pre-Sessional Preparation (PREP) course

The meeting noted the contents of a letter from Melveena McKendrick, Pro-Vice-Chancellor for Education, on behalf of the PREP Steering Group. The PREP course is an intensive residential induction course, in two sessions each of three days, funded by the Sutton Trust. Nominated students ("primarily mature") are familiarised with the Cambridge teaching system and taught study skills to ease the transition to University. The meeting agreed to discuss the general topic of pre-Michaelmas preparation courses for the Mathematical Tripos at a future meeting.

STEP Easter School

This item was deferred at the request of Dr Siklos pending a report at the next meeting.

It was reported that applicants can take STEP without a UCAS number, but that this is not clear on the relevant forms. Dr Siklos agreed to correct the forms.

Faculty Open Days

This item was deferred at the request of Dr Siklos pending a report at the next meeting. He noted that the new Open Day arrangements had worked well. Concerns were raised about the situation at the end of each Open Day when young, possibly vulnerable, individuals were left alone at the Sidgwick Site.

7. Computational Projects (CATAM)

Distribution of marks to students

Some Directors of Studies had complained this year about the mechanism used to distribute Part IB students' marks on the two "Core" CATAM projects in the middle of Lent Term. Some students received their marks several days later than others. It is impossible to solve this problem entirely, and email distribution of marks was considered too risky, but it was agreed that when the marks are sent out to Senior Tutors at each College next academic year, an email will also be sent to all Directors of Studies and Part IB students telling them that the marks are on their way and that they should be delivered to students (via the Director of Studies) within a few days.

Supported programming language

Dr Hunt reported that Dr Cowley, who would probably become CATAM Director next academic year, hoped to consider a change in the "supported programming language". This is currently C, but his front runner for a replacement is Matlab. No formal proposal had yet been made, but there was considerable disagreement about this possibility. Dr Nikiforakis said that the Faculty should not promote a proprietary language or package of any kind. Others said that C, a "proper" programming language, gave students a clear advantage in the job market that should not be ignored; but it was pointed out that the lack of tuition in programming skills meant that students' C programs were often poorly written and could discourage employers. There was no consensus.

Full discussion of the item was deferred until such time as there is a detailed proposal or (ideally) discussion document.

8. Transcripts: percentage marks

This item was deferred at the request of Dr Siklos, who would bring sample transcripts to the next meeting.

9. Supervisor training

This item was deferred at the request of Dr Siklos pending a report at the next meeting.

10. MIT exchange scheme

This item was deferred at the request of Dr Siklos pending a report at the next meeting.

11. Any Other Business

Dr Rath Spivack pointed out that the Faculty's "Undergraduate Admissions" web page, in its list of Colleges accepting applications for the undergraduate mathematics course, currently does not include the three relevant Colleges that admit only mature

students (Hughes Hall, Lucy Cavendish and St Edmund's College). It was agreed that these Colleges should be included in the list with a footnote explaining that they accept only applicants who will be 21 or over at entry.

12. Date of next meeting

The next meeting would be hosted by Downing College during Michaelmas Term 2008.