



Institut de Mathématiques de Jussieu

U.M.R. 7586 du C. N. R. S.

Université Pierre et Marie Curie (Paris 6)

Faculté de Mathématiques Pierre et Marie Curie (UFR 929)



CENTRE NATIONAL
DE LA RECHERCHE
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Michel Waldschmidt

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Institut de Mathématiques de Jussieu

«Théorie des Nombres », Case courrier 247

Université Pierre et Marie Curie (Paris 6)

4, Place Jussieu

F-75252 PARIS Cedex 05

**Rapport sur ma mission au Cambodge
du 26 septembre 2010 au 20 octobre 2010
(avec deux passages au Vietnam fin septembre et fin octobre)**

Ce rapport est en deux parties:

*l'une, consacrée à ma mission au Cambodge, est en anglais,
l'autre, à mes deux passages au Vietnam à l'aller et au retour, est en français.*

This report has two parts:

*the first one, on my visit to Cambodia, is in English,
the other one, dealing with Vietnam, is in French¹.*

*The annex, in French, deals with the situation of the young Cambodian
mathematicians.*

First part: my visit to Cambodia from September 26 to October 20.

I came to Cambodia for teaching two courses to students in the Royal University of Phnom Penh (RUPP). These two courses, the first one on linear algebra, the other one on real analysis, were preliminary courses before the start of the Master Program on November 17, 2010, the first course being given by Michel Jambu. Two further preliminary similar courses by Pierre Arnoux are scheduled from October 22 to November 12. The goal of these four preliminary courses is twofold: firstly, to strengthen the backgrounds of the students who will pursue their studies in the Master program, secondly, to select these students.

I taught the course of linear algebra in the morning from 8:30 am to 11:30 am, the course on real analysis in the afternoon from 1:30 pm to 4:30 pm. Before reaching Cambodia, I did not know that there would be a two days break (even 4 days, since it was just before a week-end), due to the festival of P'chum Ben. It is unfortunate that I was not told in advance (and I have asked the coordinator to inform the teachers who will deliver the courses later of the possible festivals during the time of their visits), but it turned out to be very useful both for me and for the students to have such a break right in the middle. For each course I gave two assignments and one final exam. The final note is the maximum between the note of the final exam and the average between the final exam and the best of the two assignments. The detailed program, the subjects and solutions of the control exams, as well as the references of the textbooks together

¹I write the first part in English so that the teachers of the Master Program will all be able to read it.

with the URL of their pdf files, are on my web site

<http://www.math.jussieu.fr/~miw/coursCambodge2010.html>

These courses turned out to be very important for the students, for several reasons. For many of them, it was the first time they attended a course of mathematics which was not given in Khmer, and at the beginning they found it very hard. Next, they had a very superficial knowledge of basic facts in mathematics which should have been taught at the early years of their studies in the University. To be enrolled in this program, a student needs to have a BSc (licence), and the studies for BSc in RUPP are 4 years. But apparently the courses which are taught during these 4 years do not contain enough background on the theory. For instance, in the course of linear algebra, after the sections on linear equations, matrices, determinants and vectors, I started the section on introduction to vector spaces. I reminded them of the definitions, I gave examples, and then I defined vector subspaces. When I asked them to give examples of a subspace of \mathbf{R}^2 , the first answers I received were: a circle, next a parabola . . . After some time a student proposed a line, but apparently neither him nor his colleagues knew it should pass through the origin.

I had another even more dramatic experience from the pedagogical point of view: I defined eigenvalues and eigenvectors, I asked them whether they could tell me when a matrix could have a zero eigenvalue; we discussed this question, and after that I asked them when a matrix could have a zero eigenvector. Since they did not know the answer, I showed them the definition on the white board and I read only the beginning: *an eigenvector is a non-zero vector satisfying. . .* Then I repeated my question, no one found the right answer (they proposed complicated solutions). I repeated the process several times, and after a while I gave up and I gave them the answer: NEVER! This story shows how hard it is to communicate with them.

I may add that most of them were far better in algebra than in analysis. One course in third year of BSc is called general topology, but they had not the least idea of what is an open subset of the real numbers. It will be necessary for the teachers who come later for the master course to start with the prerequisites, since the students may lack the basic knowledge.

Some 50 students registered, about 40 of them attended the first courses, for the last exam they were almost 30. We need to wait the end of Pierre Arnoux's courses to select the ones who will continue; we would have been ready to enroll about 20 students for M1, but it is not clear that there will be enough good candidates, so we may reduce the number to less than 20.

Before my coming to Cambodia, I knew from Chan Roath that there was a bright young student girl, Tor Kimsy, who was the only student to have obtained the higher mark in mathematics at the end of the high schools studies this year. He had already taken care of getting a scholarship for her to pursue her studies abroad in Europa, but before she was able to leave, he was concerned that she

should not waste time. I suggested that she attends my courses, which she did. In algebra she had the maximum mark (only one other students did the same). Analysis was harder for her, due to lack of background, but she did better than most of the other students who have attended four years of BSc in RUPP.

I had a meeting with Lav Chhiv Eav, the Rector of RUPP on Friday, October 15, before my courses. I told him that I was concerned by the fact that some of the best students were going to leave the program before knowing whether they are selected or not, and instead go to the Faculty of Education (the entrance exam took place one week after I started my courses, the day before and the day of the exam there were only half of the previous participants, 20 instead of more than 40). We need to find a way of attracting the best students, and ideally one good solution would be to find a financial support so that the selected students receive a salary, like in the best *Grandes Écoles* in France. We are far from being able to reach this goal, but in the mean time I told him that it is important that the selected students do not have registration fees to pay. I also told him that we were expecting that Seam Ngonn would become the coordinator of the Master Program in RUPP as soon as he will be back in January – he will also deliver a course at the end of the academic year.

I had a meeting with Gilbert Palaoro, the head of the Agence Universitaire pour la Francophonie (AUF), on Monday, October 18, between my two courses. We discussed the possibility of organizing cyber-conferences for the students of Master 2, so that they could deliver a lecture on their thesis. Since there is no Master 2 program this year, the first time such cyber-conferences would be organized would be in summer 2012, so there is time to think about it, but it seems worth to investigate further. Another subject we discussed was the opening of courses of French in RUPP for the mathematics students. This is something which could be done — however the fact that there are extremely few scholarships now from France for students to pursue their studies, such a course may not be as attractive as it was earlier. The call for offer from AUF for next year is not yet open, but it should open soon. The scholarships are for cotutelle (*sandwiches*) studies, but so far there is no mathematician in Cambodia who could reasonably act as a thesis advisor.

I met Mathieu Bernardi, French Attaché Scientifique at the Ambassade de France in Phnom Penh, on Monday, October 18, after my courses. He knows very well this Master program in Mathematics, he told me that he is impressed by our activities, but the funds of the SCAC (Service de Coopération et d'Action Culturelle) have been considerably reduced during the recent years, there is no hope that it will be better in the near future, and chances for our students to pursue their studies in France are very low. Right now there are 4 bright young students (Ham Karim, Hun Kanal, Chamroeunvuth Kim and Heng Sokly) who are willing to pursue but have no financial support for that. We are looking for supports for them so that they could prepare a PhD.

I met Chan Roath the very first day of my arrival; he kindly invited me to

give a course in Khemarak University, during the three week-ends of my stay in Cambodia, with the same schedule as during the week-days at RUPP, namely 6 hours a day on Saturdays and Sundays. I only agreed to give one lecture to his students on the first Saturday morning. Following what he suggested, I gave an overview of the research in mathematics, with a panorama of the international organization, including some of the main institutions like IMU, also the CIMPA of course. After that, I gave a few examples of open problems in number theory. I spoke in French and Chan Roath translated into Khmer.

The coordinator of this Master program last year was Mauk Pheakdei. Now that he is in Europa for his studies, he has been replaced by Ham Karim. I asked a lot to Karim, and he was very kind to do the maximum he could. He even gave me some information from tourist agencies to help me to organize my four days holidays during P'Chum Ben (I finally used Experiences Xplore Asia to visit the Mekong River near the Laos border, a very interesting trip which I recommend) and for my trip back to Vietnam (the agency 2world Travel Cambodia recommended by Ham Karim is efficient). Also he asked his colleagues from the Computer Science Department to update the pages dedicated to the Master Program on the web site of RUPP, something which has not been done during more than one year:

<http://www.rupp.edu.kh/master/mathematics/mathematics.php>

It is really a pity that no mathematician from URPP is allowed to manage this web site.

For each of my courses some students took care to bring me fresh water, to bring the pens for the white board and the eraser², some student was in charge of opening and closing the door. I took my lunches at the University, almost always Sok Lin joined me. Also Hun Kanal and Vuthy came a number of times; they both invited me for a dinner near the beginning of my stay and with Sim Tepmony to another dinner towards the end of my stay.

This visit has been extremely dense, this was a very interesting experience for me, and I feel that such courses are very important for the students. They need to complete the knowledge they are supposed to acquire during their BSc studies, and this is a must if they are willing to pursue their studies. Maybe it would be more appropriate to organize the preliminary courses a little bit earlier, before the selection by the Faculty of Education. I wish very much to come back to Cambodia, but I would prefer to teach only one course and have a more relaxed time there.

Both visits to Vietnam and Cambodia have been fully supported financially by the CIMPA. The RUPP Master in Cambodia is a very strong program which was started and is supported by CIMPA, I feel fortunate to have the opportunity

²I was not very happy with the quality of the white board and of the pens, but otherwise the material conditions are good; the class room is air-conditioned and has enough space, including for the exams where it is necessary to distribute the students far one from each others.

to contribute. Thanks to a Memorandum of Understanding between Paris VI and RUPP, the courses I taught in Phnom Penh are counted as part of my teaching duties in Paris – I wish other universities will follow this excellent example, which is a recommendation of the COPED (Comité pour les Pays en Développement of the French Academy of Sciences).

Annexe:

Étudiants poursuivant des études après le Master en 2010

- *Enseignants de l'URPP ayant eu un Master:*

Aux Etats-Unis:

Lim Sokly, Hun Touch

En Russie

Ngov Simrong

- *Nouvelle génération:*

- Kao Muysan : après avoir obtenu sa licence à l'URPP et y avoir enseigné un an, il a bénéficié d'une bourse de l'AUF en 2003–2004 qui lui a permis d'obtenir son Master à Pau . Ne semble pas envisager de poursuivre.
- Sim Tepmony: a fait ses études à l'URPP, a ensuite bénéficié d'une bourse ERASMUS 2008-2010 pour étudier en Allemagne, puis en France (Paris), puis en Italie (Venise), à la suite de quoi il a obtenu son Master d'économie et finances. Enseigne à l'ITC en mathématiques appliquées
- Mauk Pheakdei : bourse du gouvernement indien pour étudier à Delhi où il eu un Master, puis a obtenu une bourse du programme européen EMMA pour préparer un Doctorat à l'université de Heidelberg à partir de septembre 2009. Mais il a quitté pour aller à Nice où son épouse bénéficie d'une bourse EMMA. A coordonné le programme de master au Cambodge en 2008/2009.
- Seam Ngonn : après avoir obtenu sa licence à l'URPP et y avoir enseigné un an, il a bénéficié d'une bourse de l'AUF en 2005–2006 pour faire des études à Pau où il a obtenu son Master. Après être rentré un an au Cambodge, il est reparti à Pau, grâce à une bourse du gouvernement français attribuée par l'Ambassade de France, où il a fait ses études de doctorat, qui se sont concrétisées le 16 juin 2010, quand il a soutenu sa thèse sous la direction de Guy Vallet. Il deviendra responsable de la coordination du Master de l'URPP dès son retour en janvier 2011.
- Chhay Rumnea: a obtenu son Master à Nantes sous la direction de Didier Robert grâce à une bourse de l'AUF en 2006-2007. Elle a fait un séjour ensuite en France (où elle se trouve actuellement) pour compléter sa formation, mais elle n'envisage apparemment plus maintenant de poursuivre ses études. Elle a un poste d'enseignante à l'Académie Royale du Cambodge.
- Ou Pich Hang: a obtenu son Master à Pune grâce à une bourse du

gouvernement indien. Il a actuellement une bourse de la Chine depuis 2008 pour préparer une thèse à SCNU, South China Normal University, Guanzhou, Guandong Province, près de Shanghai, sous la direction de Liu Biolin en mathématiques financières.

- Sok Lin: a bénéficié d'une bourse de l'AUF en 2006-2007 pour aller à l'Université d'Aix-Marseille II où il a eu son Master 2 sous la direction de François Rodier. Après un an au Cambodge, il a obtenu une bourse du gouvernement français attribuée par l'Ambassade de France à partir de 2009 pour poursuivre en thèse (à France Télécom) avec Patrick Solé - mais l'Ambassade a mis des conditions drastiques sur la gestion de sa bourse, lui imposant par exemple un directeur de thèse au Cambodge, et l'empêchant d'assister aux cours de la rentrée d'Octobre 2010 en France. Ira 6 mois en France à partir de janvier. Enseigne à l'URPP.
- Ham Karim: a le Master de Maths de l'Académie Royale du Cambodge. A bénéficié d'une bourse pour étudier pendant 18 mois à Hong Kong avec Kar Ping Sum, mais n'a pas eu de diplôme (il aurait dû s'inscrire en Master pour compléter sa formation). En attente d'une bourse, enseigne à Phnom Penh.
- Hun Kanal: a eu un financement du CIMPA pour aller à Hanoi où il a obtenu son Master 1 en 2007-2008, suivi par un master 2 à l'Université de Tours en 2008-9 avec succès (bourse du gouvernement français attribuée par l'Ambassade de France). A dû revenir au Cambodge une année faute de bourse pour commencer son doctorat. Il a été accepté par un directeur de thèse et nous recherchons un financement pour son retour en France en 2010.
- Chamroeunvuthy Kim: a obtenu son Master 2 à l'Université de Paris 1 en 2008-2009 grâce à une bourse du gouvernement français attribuée par l'Ambassade de France. Souhaite continuer, il a l'accord de Xavier Bressaud comme directeur de thèse, mais il n'a pas de financement.
- Heng Sokly : a obtenu son Master à l'université de Nice en 2008-9 sous la direction de Bernard Rousselet, grâce à une bourse du gouvernement français attribuée par l'Ambassade de France. En attente d'un financement pour commencer son doctorat à l'université de Nice (il a été accepté par un directeur de thèse).
- Lin Mongkolseriy: parti à l'Université Mahidol de Bangkok en septembre 2010 pour préparer un Master avec un financement de l'US National Committee on Mathematics (USNCM).
- Meas Len et Dy Chang Eng: vont à Hanoi en 2010-2011 pour préparer un Master, financés par la Société Mathématique Européenne.

N.B. . . : Liste d'enseignants parlant Khmer qui pourraient intervenir au niveau de la licence de l'URPP: Lim Sokly, Hun Touch, Khvay Sopheap, Kao Muysan, Mauk Pheakdei, Seam Ngonn, Chhay Rumnea, Hun Kanal.

P.S. : Deux étudiants laotiens suivent actuellement (2010-2011) les cours de M1 à l'URPP, financés par l'USNCM: Ick Vong et Dohnbandit Bienthanong

Page de mon site consacrée à ce programme:

<http://www.math.jussieu.fr/~miw/coursCambodge2010.html>

Il y a plusieurs liens sur cette page, l'un au site de l'URPP

<http://www.rupp.edu.kh/master/mathematics/mathematics.php>

qui n'est pas mis à jour depuis de nombreux mois mais qui contient quand même des informations sur ce sujet. Sur le site du CIMPA il y a d'autres informations sur le début du programme

<http://www.cimpa-icpam.org/anciensite/Francais/Cooperations/Cambodge.html>

<http://www.cimpa-icpam.org/anciensite/Francais/Cooperations/MasterURPP.pdf>

et sur les actions en cours

<http://www.cimpa-icpam.org/spip.php?rubrique47>

<http://www.cimpa-icpam.org/spip.php?article273>

The Volunteer Lecturer Program (VLP)

<http://www.math.ohio-state.edu/ imu.cdc/vlp/index.php>

is an initiative of the American Mathematical Society sponsored by the Developing Countries Strategy Group of the International Mathematical Union, in cooperation with CIMPA and the U.S National Committee for Mathematics (USNCM)

<http://sites.nationalacademies.org/PGA/biso/IMU/index.htm>

See a report in the Notices of the American Mathematical Society, vol. **56**, n° 7, August 2009 , p. 851:

<http://www.ams.org/notices/200907/rtx090700850p.pdf>.

According to

<http://www.math.ohio-state.edu/ imu.cdc/vlp/history.php>

this program was initiated as follows:

In response to the need to rebuild the possibility of the Cambodians to learn, teach and use mathematics for their country's development, a beautiful project of international cooperation has been created over the last few years by France's International Center for Pure and Applied Mathematics (CIMPA), under the direction of Professor Michel Jambu of the University of Nice, and with the internal leadership of Cambodia's one Ph.D. in pure mathematics, Dr. Chan Roath.

URL of this report: <http://www.math.jussieu.fr/~miw/articles/pdf/RptVietnamCambodge2010.pdf>

4, Place Jussieu Bureau 15-25 426

Tél. : [33] (0)1 44 27 53 36

<http://www.math.jussieu.fr/~miw/cooperations.html>

Secr. : [33] (0)1 44 27 53 44

Fax : [33] (0)1 44 27 63 25

miw@math.jussieu.fr

Deuxième partie: mes passages à Ho Chi Minh Ville à l'aller le 24 septembre et au retour les 21 et 22 octobre.

Je passe souvent par Ho Chi Minh quand je vais à Phnom Penh, ce qui me permet de rendre visite à Bui Xuan Hai et quelquefois de donner un cours à l'University of Science HCMUS,

<http://www.hcmus.edu.vn>

J'avais initialement prévu de de le faire cette année, mais pour des raisons familiales j'ai reporté ce projet, probablement à 2012. J'avais déjà mon billet d'avion de Paris à Ho Chi Minh Ville quand j'ai appris le 1 septembre que Pham Minh Hoang avait été arrêté à Ho Chi Minh le 13 août et que sa famille n'était pas autorisée à le rencontrer. J'avais fait sa connaissance lors de ma toute première visite au Vietnam, en automne 2006. Il m'avait invité à l'Institut Polytechnique (HCMUT Ho Chi Minh University of Technology) où il enseignait. C'est lui qui avait traduit en Khmer un exposé que j'ai donné à ses étudiants. J'en parle dans mon rapport de mission

<http://www.math.jussieu.fr/~miw/articles/pdf/RptVietnam2006.pdf>
pour lequel il y a une référence sur mon site

<http://www.math.jussieu.fr/~miw/cooperations.html>

C'est d'ailleurs grâce à ce lien que j'ai été contacté par ses proches qui ont fait des recherches sur internet, ont trouvé mon rapport et m'ont alerté. Je mets des liens sur cette question sur la page d'accueil de mon site

<http://www.math.jussieu.fr/~miw/index2.html>

J'ai profité de mon passage à l'aller pour rendre visite à son épouse, j'ai fait la connaissance de leur fille de 6 ans. Au retour j'ai été de nouveau reçu par sa famille, j'ai vu son épouse, sa mère qui a près de 90 ans, et sa belle mère. J'ai apprécié la légendaire hospitalité vietnamienne. Dans cette épreuves sa famille montre une remarquable sérénité et une très grande dignité. J'ai ensuite été reçu par le Consul de France à Ho Chi Minh, qui est le seul à avoir droit de le rencontrer une fois par mois (à l'exclusion de sa famille et de son avocat, tant que l'enquête n'est pas terminée).

Je souhaite vivement qu'une mobilisation de la communauté mathématique internationale contribue à lui permettre d'être libéré et de poursuivre ses enseignements.

URL of this report: <http://www.math.jussieu.fr/~miw/articles/pdf/RptVietnamCambodge2010.pdf>

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