The Assessment Report of

the Research Institute for Mathematical Sciences, Kyoto University

August, 2007

RIMS

Research Institute for Mathematical Sciences
Kyoto University

Preface

Forty four years has passed since Research Institute for Mathematical Sciences (RIMS) was founded in 1963. Since then, RIMS has tried to help research activities in mathematical sciences in Japan through RIMS conferences, workshops, etc. RIMS has strengthened its international activities by RIMS international Project starting in 1991.

After privatization of national universities in 2004, the status of cooperative institutes is changing.

We have asked the assessment committee to assess RIMS as an international mathematical research center at the period of change in order to advance its international activities.

We asked Prof. Tadao Oda as the chair of the Assessment Committee, Prof. J.-P. Bourguignon and Prof. A. D. D. Craik as members from overseas, and Prof. Hitoshi Ishii and Prof. Sadayoshi Kojima. Assessment committee has presented the report in English reflecting its international nature. I would like to thank all the members of the committee for their laborious efforts. I especially thank Chair Oda for his efforts as a chair and also for his efforts in its translation into Japanese.

In the report, we find numerous constructive comments, especially on the building and recruiting new faculty members at the generation change, which will be helpful for our future trials to advance international activities of RIMS.

Masaki Kashiwara
Director,
Research Institute for
Mathematical Sciences,
Kyoto University

The Assessment Report of the Research Institute for Mathematical Sciences, Kyoto University

May 16–17, 2007

Contents

Introduction

Research Institute for Mathematical Sciences, Kyoto University (RIMS, for short, as it is known throughout the world) was established in April 1963 as a cooperative research institute attached to Kyoto University. Its mission is

"to carry out comprehensive research in mathematical sciences as well as to provide services for cooperative use by researchers belonging to universities and other research institutions throughout the country."

Under the new national university system introduced in April 2004, however, Kyoto University is no longer a government-owned institution and has more independence. Consequently, the status of RIMS as a *"cooperative research institute attached to a university"* depends on the outcome of the ongoing policy reexamination by the Government as well as on the policy decisions of Kyoto University.

This uncertainty notwithstanding, RIMS continues to play increasingly important roles (1) in conducting research activities of its own, (2) in fostering young talent, and (3) as a center for cooperative research. Each of these three missions has taken on ever-growing international character. As a result, RIMS has for quite some time been recognized as one of the few important international research centers of excellence in the mathematical sciences.

Accordingly, this Assessment Committee was asked by RIMS to

assess RIMS as an international mathematical research center.

After examining the "Report on Self-evaluation (August 2006)" and other relevant materials provided beforehand, the members of the committee visited RIMS on May 16–17, 2007 and carried out the activities described in Appendix A.

All discussions, presentations and interviews were conducted in English, and much of the supporting documentation was provided in English translation. The two non-Japanese members of the Assessment Committee are appreciative of the huge efforts made for their benefit and thank all concerned.

Summary of the findings and recommendations

Findings

(1) The research activities of RIMS are outstanding, and the Institute has long been recognized as one of a small number of leading international research centers in mathematical sciences. Many current and former faculty members are internationally-known leaders in research, bestowed with honors and prizes, sought after to speak at international conferences, and able to attract eminent international visitors to RIMS.

(2) RIMS plays an important and increasingly international role in fostering young talent, through graduate-level education, support of postdoctoral fellows, and other "outreach" activities.

(3) As a cooperative research institute, RIMS welcomes many reseach visitors in mathematical sciences from Japan and overseas for conferences, symposia and workshops. The RIMS Project Research since 1991 is the core of its activities as an international cooperative research center, and many external proposals for workshops and symposia are also accepted.

(4) The present building of RIMS is much too small and is not up to the standard of an institute of this scientific quality. The facilities at RIMS are lagging behind those of newer research institutes elsewhere.

Recommendations

(1) New facilities for mathematical research being developed worldwide pose fresh challenges and opportunities for the Japanese mathematical community. To consolidate its role as a leading international institute, RIMS is well placed to capitalize on the goodwill and repute that has been earned over the years.

(2) For RIMS to compete successfully with comparable institutes abroad, the acute shortage of space for RIMS needs to be dealt with urgently. Essential needs are: (i) better conference facilities for the many workshops and symposia; (ii) improved office accommodations, with all staff, visitors, postdoctoral fellows and graduate students housed on a single site to facilitate easy interaction; (iii) increased library space. One possibility worth investigating is the separation of conference facilities and office space.

(3) With several forthcoming retirements of senior faculty members, the next few years will be critical in determining the future composition of RIMS. In making new appointments, RIMS has an opportunity to strengthen its role as an international research center. While continuing to give priority to excellence in making faculty appointments in key areas of pure and applied Mathematics, RIMS may wish to seek new professors worldwide and also to consider outstanding mathematicians with backgrounds in neighboring scientific disciplines.

(4) To cope with the serious decrease of young talent entering science in developed countries, RIMS should continue its "outreach" activities; but its most valuable role may be in graduate-level education and acceptance of postdoctoral fellows from Japan and overseas.

(5) To effectively support RIMS as an international research center, and to secure necessary funds for development, a new and transparent design for the future might be sought, through cooperation with the Government, Kyoto University, and the mathematical community of Japan. Important matters for consideration include (i) the space problem mentioned above, (ii) allocating a part of the cooperative research budget for international academic exchange in connection with the RIMS Project Research, (iii) launching the planned "retreat style" symposia for younger researchers; (iv) more selectivity in adopting proposals for conferences and workshops.

1 Assessment of the three missions of RIMS

Located in the attractive city of Kyoto, RIMS is one of few international research centers capable of attracting visitors from all over the world. Additional advantages are the proximity of Kyoto University's Department of Mathematics, with its own group of excellent pure mathematicians; and, for applied Mathematics, the presence of many fine researchers in other departments, research institutes and graduate schools of Kyoto University, including Physics, Engineering and Informatics.

RIMS has three missions:

(1) carrying out comprehensive research in mathematical sciences,

(2) fostering young talent through the graduate-level education as the "Division of Mathematical Sciences" of the Graduate School of Science, Kyoto University as well as by accepting postdoctoral fellows,

(3) providing services for cooperative use by researchers belonging to universities and other research institutions througout the country.

RIMS currently has a maximum of 42 faculty members (13 professors, 14 associate professors, and 15 assistant professors at maximum). In addition, RIMS has three international visiting professorship positions, which could be split up into at most twelve positions each year to invite international visiting professors for periods of over three months.

The policy decisions of RIMS are made by the Executive Board, the Advisory Board, and the Technical Board depending on their nature. The Executive Board comprises the Director and the professors of RIMS as well as several professors of Kyoto University (currently, one each from the Department of Mathematics, the Yukawa Institute for Theoretical Physics and the Graduate Schools of Engineering and Informatics). The Director is elected every two years by the Executive Board from among the professors of Kyoto University. The other two Boards include members from outside Kyoto University, and deal with the activities of RIMS as a cooperative research institute.

1.1 The mission of carrying out research

Research in mathematical sciences in Japan has been international ever since the nineteenth century. The role of RIMS in this respect is outstanding. There are quite a number of current and former faculty members of RIMS who are leading figures in the international arena of mathematical research.

The list of publications, honors, prizes, and invited lectures at the International Congresses of Mathematicians indicates that impressive research is carried out by the members of RIMS. Notable among them is the awarding to members, including emeritus members, of two Fields medals, the first ICM Gauss medal and two Wolf prizes.

Many RIMS members have been sought after as invited speakers at important international conferences. As the list of international visitors testifies, many international visitors come to RIMS for fruitful mathematical discussions with RIMS members. For instance, international visiting professorship positions have been used almost fully. As a result, RIMS has been recognized for quite some time as one of a small number of international research centers in mathematical sciences.

The current faculty members of RIMS could be roughly classified into two groups: namely "pure Mathematics" (9 professors, 8 associate professors, 1 lecturer, 8 assistant professors) and "applied Mathematics" (4 professors, 4 associate professors, 5 assistant professors).

Recent appointments and promotions have chosen highly-talented individuals whose future contributions are likely to be valuable, and some of these have been in "applied" areas.

The faculty members of RIMS are very productive in their research activities, many of which are of world-class quality and have been recognized by honors and prizes, in the following fields: algebraic analysis, algebraic geometry, arithmetic geometry, number theory, complex analytic geometry, representation theory, topology, differential equations, asymptotic analysis, stochastic

analysis, dynamical systems, combinatorial optimization, theoretical computer science, fluid mechanics, numerical analysis, quantum field theory and mathematical physics.

In April 2006, RIMS established the Center for Research at the Frontiers of Mathematical Sciences, in order to respond promptly and flexibly to recent trends in mathematical sciences, although it has no budgetary basis at the moment. It consists of RIMS professors and at most two visiting professors.

RIMS has recently introduced non-tenured positions for assistant professors. These positions are for five years, with the possibility, subject to approval, of extension for a further five years. This new system of non-tenured positions was chosen to ensure the mobility of young faculty members of RIMS.

RIMS and the Department of Mathematics of Kyoto University hold weekly joint colloquia.

In spite of their geographical and thematic proximity, there is less joint work between RIMS and the Yukawa Institute for Theoretical Physics than might be expected.

1.2 The mission of fostering young talent

Since 1975, RIMS offers the graduate-level education program as "Division of Mathematical Sciences" of the Graduate School of Science, Kyoto University. This is conducted in close cooperation with the program of the "Division of Mathematics" of the Graduate School of Science offered by the Department of Mathematics, Kyoto University. These graduate programs lead to the MS and DSc degrees. This graduate-level education is carried out through lectures and seminars in small groups conducted by leading figures. There is close contact between students and advisors. The graduate students interviewed spoke warmly of the stimulating research environment, and confirmed that they are able to live close to the campus.

In the academic year 2006, the numbers of graduate students at RIMS were: 9 (M1), 7 (M2), 3 (M others), 6 (D1), 2 (D2), 5 (D3), 5 (D others). By September 2006, RIMS has conferred 115 DSc's altogether. RIMS could accept up to 20 Master and 10 Doctoral students each year, but these quotas are not fully attained. As a result, the number of DSc's conferred in the last five years have been fewer than expected. This is probably due to the wish of RIMS to maintain high standards by admitting only very well-qualified students.

Involvement of RIMS faculty members in teaching Master courses both for graduate students at RIMS and at the Department of Mathematics, Kyoto University, is commendable.

Some limited involvement in an "outreach program" to senior undergraduate courses at the Department of Mathematics, Kyoto University, is doubtless important for recruitment of graduate students at RIMS, and might be beneficial in stimulating students to go on to more advanced studies. Perhaps junior researchers at RIMS (assistant professors and postdoctoral fellows) would most benefit from doing some such teaching.

The lecture series "Modern Mathematics and Mathematical Sciences — Basic Concepts and their applications to other disciplines" by RIMS faculty members for freshmen of Kyoto University must be stimulating for freshmen and an interesting challenge for RIMS faculty members.

The RIMS public introductory lecture series every summer since 1976 is a worthwhile "outreach activity" for popularizing mathematical sciences. It is commendable that first-rate mathematicians at RIMS are engaged in such activities.

At present there are about ten funded posts of postdoctoral fellows available to young researchers. Some of these posts are funded by the 21st Century COE Program (see below). RIMS also accepts postdoctoral fellows funded by the Japan Society for the Promotion of Science. RIMS is doing an excellent job in attracting able postdoctoral fellows both from Japan and from overseas, and in providing them with a first-class research environment. One postdoctoral fellow from overseas spoke of the intensive instruction in Japanese that he had undertaken, along with his mathematical studies. As a result, he has obtained the invaluable ability to operate effectively in Japan for the rest of his life.

Since 2003, the 21st Century COE Program "Formation of an International Center of Excellence at the Frontiers of Mathematics and Fostering of Researchers in Future Generations" (Program Leader: Masaki KASHIWARA) has been run jointly by RIMS and the Department of Mathematics, Kyoto University. This has greatly enhanced the ability of both RIMS and Department of Mathematics to foster future researchers in mathematical sciences. It has created more opportunities for students and young researchers involved in this program to have higher educational, research, and professional experiences including international research activities. As a result, RIMS has more postdoctoral positions than before. Also, RIMS and the Department of Mathematics, Kyoto University, together with Seoul National University, hold a joint symposium every year for graduate students and young researchers. Thereby, students from Japan and South Korea enjoy an environment that encourages international collaboration and joint research.

RIMS has thus been playing increasingly important international roles in fostering young talent.

1.3 The mission as a cooperative research institute

RIMS has each year welcomed around 4,000 researchers in the mathematical sciences in Japan and more than 200 from abroad, who either come as long-term research visitors or participate in the many conferences, symposia and workshops held at RIMS each year, many of them with international character.

To meet the demand from the mathematical community, RIMS has been expanding its activities. This has mainly been accomplished through its international Project Research (since 1991), and by the 21st Century COE Program during the last five years. Those initiatives provide links among the three *a priori* rather loosely connected missions of RIMS.

Each year since 1991, RIMS has supported a special topic for Project Research. This is the core of its activities as an international cooperative research center and has typically involved international conferences and visitor programs organized by a group of mathematicians including RIMS staff. But most of the workshops and symposia (numbering 70 or more) hosted each year at RIMS are organized by scholars based elsewhere in Japan. Up till now, most of the proposals received are accepted. Though each meeting receives some modest financial support, participants normally receive funding from their own grants for travel and accommodation. These meetings provide an important focus for mathematical research in Japan, and many have an international dimension.

RIMS has its own library located on the third floor of its main building. The library possesses nearly 80,000 books and 1,355 journals to meet the needs of mathematicians, theoretical

physicists, computer scientists, and others. The library also functions as an information center of the literature in mathematical sciences.

RIMS issues three kinds of publications. One is the periodical journal "Publications of the Research Institute for Mathematical Sciences" founded in 1964. Four issues of the journal constituting one volume are published each year. It has a worldwide circulation of about 800.

Another is a preprint system started in 1964 to report promptly on the studies by RIMS members as well as visitors. Nearly 1,600 preprints have been issued through this system.

The third is a series called "Kôkyûroku", most of which are proceedings of conferences, symposia and workshops supported by RIMS. Some recent issues are available on the Web at

`http://repository.kulib.kyoto-u.ac.jp/dspace/`.

This series has recently expanded into another series called "Kôkyûroku Bessatsu" containing refereed articles only, which can be purchased at bookstores.

The "Kôkyûroku" series collects a huge amount of publications (more than 25,000 articles) and it is a valuable part of the heritages of the Japanese mathematical sciences communities. The free on-line access to "Kôkyûroku" and other publications will be an important service to the international mathematical sciences communities.

Jointly with the Yukawa Institute for Theoretical Physics, RIMS maintains a building for accommodating visitors. Also, Kyoto University has apartments for housing guests in its "Shugakuin International House": these, too, are available for visitors to RIMS, but without special priority. For short stays, RIMS has special arrangements with a few hotels in Kyoto. Although it is not so easy for visitors to settle down in Kyoto because of its high cost-of-living, long term international visitors and international postdoctoral fellows seem to be having no difficulty thanks to the efficient help by RIMS supporting staff, as we found out during the interviews.

As a member of IMSI (International Mathematical Sciences Institutes) and PRIMA (Pacific Rim Mathematical Association), RIMS cooperates with other international mathematical sciences institutes. These bodies foster communication among participating members to share best practices, and to encourage cooperation, coordination, and resource-sharing.

2 Challenges and suggestions

Although the main role of this committee is to assess the activities of RIMS, we feel that it may be helpful to look to the future also, but without wishing to infringe on the autonomy of the governing bodies of RIMS, who are responsible for establishing future policy.

New facilities for mathematical research are developing worldwide, and these will pose fresh challenges and opportunities for the Japanese mathematical community. Accordingly, the RIMS Executive and Advisory Boards may wish to consider how best to capitalize on the goodwill and repute that has been earned over the years, in order to consolidate the several roles RIMS is playing as a leading international institute. One aspect to be faced is new competition caused by the establishment of several new institutes, particularly in Asia, with aims similar to that of RIMS.

RIMS may wish to consider whether to have some joint ventures with some of these new institutes as it already does with the Korean Institute for Advanced Study (KIAS) in Seoul.

2.1 Acute shortage of space

The building that was initially designed for RIMS has now become much too small and is not up to the standards of an institution of this scientific quality. The facilities at RIMS are lagging behind those of newer research institutes elsewhere.

The space for offices and the facilities for holding lectures, seminars, workshops and conferences at RIMS are under severe strain, and need a thorough renovation with more space congenial for informal discussions, as several of the institutes working on a format similar to RIMS are now offering.

At present, international visitors must share offices (sometimes as many as four or five in the same room). Some potential international visitors may be deterred from coming at all because of the lack of individual offices (in addition to the real difficulties of finding suitable accommodation and schooling for accompanying children). The growing competition among international research institutes, such as the new ones in China, is making RIMS less attractive than before. Essential needs for RIMS to win such international competition are: space for interaction among participants to conferences, office space for international visitors, adequate accommodation for visitors.

The present building of RIMS is also too small to accommodate all the staff, postdoctoral fellows and graduate students and is in serious need of upgrading. Some fellows and students are presently accommodated in offices in other buildings, some even on another campus. The temporary measure of housing staff or students in offices in other buildings is not a satisfactory long-term solution as this detracts from the easy interaction of individuals that is so important in Mathematics.

More space is needed for the Library as well due to the growing number of books and journals.

Dealing with this space problem has now become urgent, the more so because extending a building, or finding a new location, will inevitably be a lengthy process since the campus of Kyoto University is already very full. We hope that this matter will be a top priority for the RIMS directorship, and the President of Kyoto University, to ensure that RIMS can compete successfully with comparable institutes abroad and so maintain its worldwide reputation.

It must be said that the very many conferences that RIMS holds throughout the year are occupying a lot of space, yet with facilities that are not totally adequate. In particular, space for informal gatherings during the breaks of the conferences and workshops is insufficient, being confined only to small conference rooms and the small common room at the entrance. Furthermore, these spaces are not well separated from the office area. As the only such center for the mathematical sciences in Japan, RIMS needs and deserves better.

Some consideration might be given to the possibility of holding the conferences and workshops in a new facility especially devoted to such activities. Transfer of this activity would permit renovation of existing building to provide up-to-date facilities for the research and training missions of RIMS. Of course, the cost implications would be substantial.

2.2 A new generation of RIMS faculty members

With the forthcoming retirement of several prominent senior faculty members, the next few years will be critical ones in determining the future composition of RIMS.

Currently, research interests are spread over a number of distinct fields, with several small closely-interacting groups; but there seem to be rather few connections between these groups. As a result, it cannot be said that RIMS supports large groups in particular areas (and such concentration is now the norm in many major centers). Though the RIMS 'small-group' model works well in pure Mathematics, it is perhaps less well-suited to modern applied Mathematics, where larger groups tend to predominate.

Many important areas of applied Mathematics currently benefit from close collaborations between mathematicians, physicists, engineers and biologists. (Indeed, the labels 'mathematician', 'physicist' etc. are not usually interpreted so rigidly elsewhere as they are in Japan.) It may be that the structures and historical development of Mathematics, Physics, etc. in Japan are less encouraging for such interdisciplinary collaboration than in some other countries. But such interdisciplinary research is of growing importance and deserves encouragement.

In making the forthcoming new appointments, RIMS has an opportunity to strengthen its role as an international research center. While continuing to give priority to excellence in making faculty appointments in key areas of pure and applied Mathematics, RIMS may wish to seek new professors worldwide and also to consider outstanding mathematicians whose backgrounds may be in disciplines other than Mathematics (e.g., Physics, Biology, Economics, Engineering, etc.). Overseas advertisement and informal searches for candidates in the hiring process of professors and associate professors may reveal outstanding candidates who would otherwise be overlooked.

2.3 Actions to foster young talent

The decreasing number of young talent entering science in general is a serious problem in developed countries. In this respect, "outreach" activities by first-rate mathematicians at RIMS could be instrumental in attracting young talent to mathematical sciences. We hope that the Executive Board will continue the present "outreach" activities by mathematicians of RIMS. These activities can serve not only to attract youth to mathematical sciences but also to raise public awareness of Mathematics.

The main contribution RIMS could make, however, would be to nurture young talent already attracted to mathematical sciences so that they go on to become graduate students or postdoctoral fellows.

Students in the Master and Doctoral courses at RIMS have rather close ties with their advisors through regular seminar meetings, as is typical of the graduate-level education in Mathematics or mathematical sciences in Japan. This relation between students and advisors is generally very beneficial to students to focus and deepen their research activities, but it may not encourage them to take a broader view of the mathematical sciences.

More teaching experience for young researchers at RIMS would broaden their view of mathematical sciences, and develop communication skills that would be helpful in their future careers.

To increase the number of graduate students, consideration might be given to relaxing the Japanese language requirements of international graduate students, if they are of suitable mathematical caliber.

It is important that RIMS continues to attract postdoctoral fellows from overseas. At their young age, such international scholars are willing and (usually) able to learn Japanese while also undertaking research. There is later enormous benefit to be gained in having scholars familiar

with Japan who will in later life maintain their contacts and encourage others to study here.

2.4 Preparing a new scheme for cooperative research

Maintaining the function of RIMS as a cooperative research center continues to be crucial for the mathematical community in Japan and worldwide. In this role, RIMS is a precious national and international asset. However, the present demands on the building of RIMS are now surpassing its current capacity. It seems to this committee that, to maintain the quality of research and education at RIMS, and to continue providing services to the wider mathematical community, it will be necessary to develop a new scheme for the future. Hopefully, this will involve not only RIMS itself, but the Government, Kyoto University and the mathematical community in Japan.

The Project Research is one of the core international research activities which attracts researchers from all over the world. Now that the financial rules became more flexible under the new national university system, it would be beneficial for further developments of the Project Research to allocate a part of the cooperative research budget for international academic exchange in connection with the Project Research.

In addition to the successful Project Research, symposia and workshops, planned new "retreat style" symposia for younger researchers (in the style of the successful but now discontinued Taniguchi Symposia), possibly accompanied by conferences open to the wider mathematical community, could be a very effective way for RIMS to extend its international role.

The many workshops and symposia held at RIMS offer enormous benefit to the wider mathematical community. Both domestic and international meetings provide valuable opportunities for mathematicians to meet and exchange views and information. They reflect the fact that RIMS is a valued center for cooperative research among mathematicians and mathematical scientists in Japan. Indeed, this is a primary role of RIMS as a cooperative research institute.

The direct cost to RIMS of these meetings is not large, and most are organized by program leaders from elsewhere. But the present lack of space is endangering this activity. It will soon be necessary to be more selective in adopting proposals. As a short-term measure, amalgamation of proposals on similar topics might be suggested to the proposers.

Some of the recent workshops and symposia are clearly interdisciplinary. Because of the increasing importance of the interaction of Mathematics with other sciences, it is hoped that RIMS continues to encourage interdisciplinary researches.

The published "Kôkyûroku" volumes provide a record of symposia and workshops. Thirty free copies of each volume are made available to the organizers with the option of purchasing additional copies directly from the printer. Also, the new "Kôkyûroku Bessatsu" series offers selected proceedings containing refereed articles only. Thirty free copies of each volume are made available to the organizers with the option of purchasing additional copies at a discount from the distributer. Non-participants can purchase copies at low cost. For the latter, a process for university library subscriptions and associated marketing should be pursued by the publishers. The on-line availability of the recent issues of these publications is a useful service. However, the hidden costs of preparing these volumes, in terms of adminstrative staff time, must be considerable, and dependent on continuing provision of sufficient administrative staff posts.

The members of the Assessment Committee

- Jean-Pierre Bourguignon
  Directeur de recherche, Centre National de la Recherche Scientifique;
  Director, Insitut des Hautes Études Scientifiques, France
- Alexander D.D. Craik
  Professor Emeritus, School of Mathematics and Statistics, University of St. Andrews, United Kingdom
- Hitoshi Ishii
  Professor, Department of Mathematics, Faculty of Education and Integrated Arts and Sciences, Waseda University
- Sadayoshi Kojima
  Professor, Department of Mathematical and Computing Sciences, Graduate School of Information Science and Engineering, Tokyo Institute of Technology
- Tadao Oda (Chair)
  Professor Emeritus, Mathematical Institute, Graduate School of Science, Tohoku University

Appendix A: A summary of the assessment process

In the morning of May 16, Professor Masaki Kashiwara (Director of RIMS) gave a presentation on the current state of RIMS entitled "For the assessment of RIMS as an International Mathematical Research Center" (cf. Appendix B). Professors Yoichiro Takahashi (Immediate Past Director of RIMS), Kyoji Saito (Past Director of RIMS), Satoru Fujishige (Vice Director of RIMS), Hisashi Okamoto (Immediate Past Vice Director of RIMS), Takahiro Kawai (Chair of the RIMS Self-evaluation Committee), Shigeru Mukai and Michio Yamada were present. In the afternoon, the committee interviewed, individually, International Visiting Professor Ivan V. Cherednik, Professor Akio Tamagawa, Professor Masahito Hasegawa, Associate Professor Yoshitsugu Takei, Associate Professor Satoru Iwata, Associate Professor Tomotada Ohtsuki and Dr. Davide Guzzetti (21st Century COE Research Fellow).

In the morning of May 17, the committee met Professors Masaki Kashiwara (Director), Satoru Fujishige (Vice Director), Hisashi Okamoto (Immediate Past Vice Director), Takahiro Kawai (Chair, Self-evaluation Committee) and Shigeru Mukai for questions and comments. In the afternoon, the committee first carried out a collective interview in English with three graduate students: Shunsuke Tsuchioka (D1, representation theory), Kazuyuki Asada (D2, computer science) and Takuzo Okada (D2, algebraic geometry). Then the committee had the chance of briefly attending the ongoing international conference "Link homology and categorification" (organizer: Professor Hiraku Nakajima, Kyoto University) held in connection with the RIMS Project Research "Mirror symmetry and topological field theory" as well as the RIMS symposium "Study on geometric univalent function theory" (organizer: Shigeyoshi Owa, Kinki University). The committee then visited the offices at the Yukawa Institute for Theoretical Physics for informal interview in English with postdoctoral fellows present. The committee's visit to RIMS ended with a dinner where the committee could have fruitful informal discussions.

Appendix B: The Director's presentation

For the Assessment of RIMS
as an
International Mathematical
Research Center

May 16,17 2007

1

History

1963 April	Founded as a co-operative research center in Japan Aim: Promoting research in mathematical sciences
1975∽	RIMS's own graduate course in the mathematical sciences at the Division of Mathematical Sciences
1991	"International Research Project" started
2003-2007	21st Century Center of Excellence Program "Formation of an Int. COE in the Frontiers of Math. and Fostering of Researchers in Future Generations" Kyoto University, Masaki KASHIWARA (Program Leader)
(2004	Reformation of national universities in Japan)

2

Size

・Quota of faculty members

Professors	Associate Professors	Assistant Professors	Total
13	14	15	42

・Number of International Visiting Researchers by Year

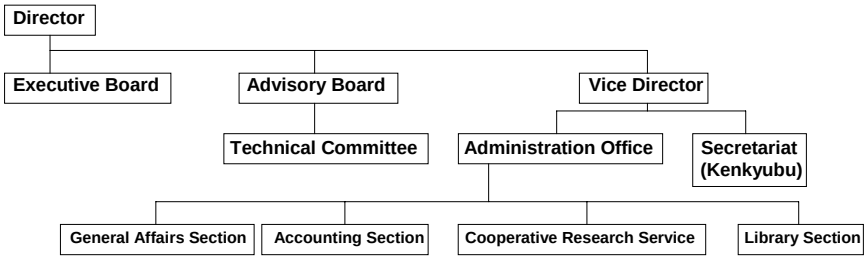
2002	2003	2004	2005	2006
210	217	255	229	319

・Total Budget (yen)

2004	2005
1,070,581,000	1,042,509,000

3

Organization



- Executive Board consists of the Director, the Professors of the Institute, and some other Professors of Kyoto University.
- Advisory board decides and makes proposals on basic policies for the cooperative research activities of the Institute.
- Technical committee screens the plans for cooperative research activities proposed by researchers throughout Japan.

4

Functions of RIMS

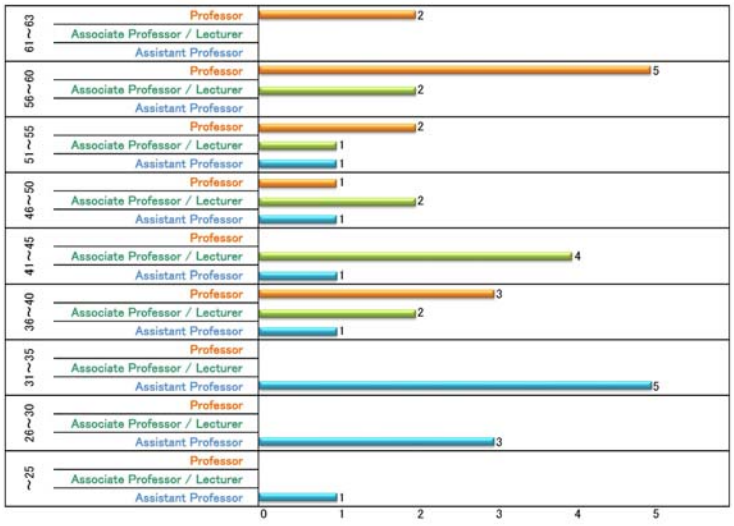
- A center of research in mathematical sciences as a division of Kyoto University
- A part of the Graduate School of Science engaged in graduate level education in mathematics jointly with the Department of Mathematics (cf. “Report on Self-evaluation (August 2006)”, p.32)
- Cooperative Research Institute serving the mathematical community in Japan

5

Faculty Members

- Their research activities cf. Report of Self-evaluation (August 2006), pp. 33—45

Professors, associate professors and assistant professors: their numbers and age distribution
(Their numbers are authorized by the government with necessary funds allocation.)



6

The honors and prizes awarded to current and former members

Year	Name	Position	Prize
2000, October	Takuya OOURA	Assistant Professor	The Japan Society for Industrial and Applied Mathematics Best Article Award
2001, April	Masahito HASEGAWA (Yoshihiko KAKUTANI)	Lecturer	ETAPS2001 Best Theoretical Paper Award
2002, February	Osamu FUJINO	Assistant Professor	Inoue Award for Young Researchers
2002, February	Hisashi OKAMOTO	Professor	Inoue Science Award
2002	Masaki KASHIWARA	Professor	Paris Academie des Sciences
2003, March	Akihisa TAMURA	Associate Professor	The Operations Research Society of Japan, Fellow
2003, March	Tomotada OHTSUKI	Associate Professor	MSJ Spring Prize
2003, May	Mikio SATO	Professor Emeritus	Wolf Prize
2003, July	Huzihiro ARAKI	Professor Emeritus	Henry Poincare Prize
2003, August	Satoru FUJISHIGE	Professor	Fulkerson Prize
2003, September	Susumu ARIKI	Associate Professor	MSJ Autumn Prize
2003, October	Shigeru MUKAI	Professor	Osaka Science Award
2003, November	Kiyosi ITO	Professor Emeritus	Cultural Merit Prize
2004, January	Heisuke HIRONAKA	Professor Emeritus	Legion d'honneur

7

Year	Name	Position	Prize
2004, March	Takashi KUMAGAI	Associate Professor	MSJ Spring Prize
2004, June	Shigefumi MORI	Professor	Fujiwara Prize
2005, February	Shinichi MOCHIZUKI	Professor	JSPS Prize
2005, March	Shinichi MOCHIZUKI	Professor	Japan Academy Medal
2005, September	Katsutoshi YAMANOI	Assistant Professor	MSJ Takebe Prize
2005, September	Takuya OOURA	Assistant Professor	The Japan Society for Industrial and Applied Mathematics Best Article Award
2005, November	Masahito HASEGAWA	Associate Professor	Japan IBM Science Prize
2006, August	Kiyosi ITO	Professor Emeritus	IMU Carl Friedrich Gauss Prize
2006, September	Toshiyuki KOBAYASHI	Professor	Osaka Science Award
2007, January	Toshiyuki KOBAYASHI	Professor	JSPS Prize
2007	Satoru IWATA	Associate Professor	Young Science Award

8

Members capable of attracting many international visitors

ICM Invited Speakers

2002 Beijing, 45-min. lecture, Algebraic and Complex Geometry: Shigeru Mukai
Lie Groups and Lie Algebras: Toshiyuki Kobayashi
1998 Berlin, 60-min. lecture : Tetsuji Miwa
45-min. lecture, Number Theory and Arithmetic: Shinichi Mochizuki, Takeshi Tsuji
Numerical Analysis and Scientific Computing: Hisashi Okamoto
1994 Zurich, 45-min. lecture, Algebraic Geometry : Yoichi Miyaoka
1990 Kyoto, 60-min. lecture : Yasutaka Ihara, Shigefumi Mori
45-min. lecture, Algebraic Geometry: Morihiko Saito
Lie Groups and Lie Algebras: Masaki Kashiwara
Analysis: Takeo Ohsawa, Kyoji Saito
Partial Differential Equations: Shigeo Kusuoka
Mathematical Physics: Kanehisa Takasaki
Combinatorics: Michio Jimbo
1986 Berkeley, 45-min. lecture, Real and Functional Analysis: Tetsuji Miwa

9

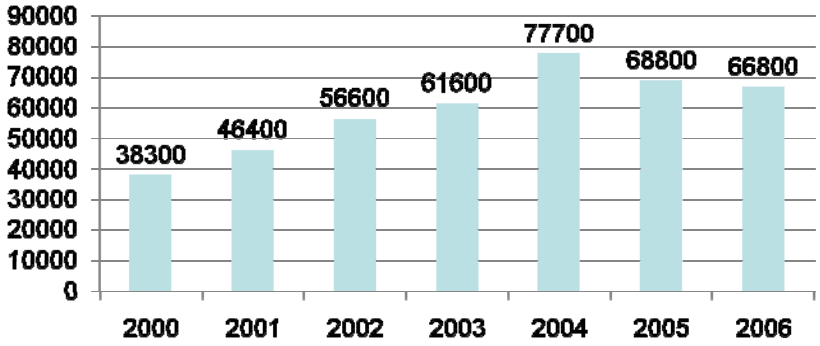
Invited Lectures

2006.10.26-10.29 The Korean Mathematical Society sixtieth anniversary Conference at Seoul University: Masaki Kashiwara
2006.9.8-9.14 Representation Theory and Prehomogeneous Vector Spaces at Strasbourg University: Toshiyuki Kobayashi
2006.7.16-7.23 International Research Training Group, Summer School at Ulm Univ., Science Center: Toshiyuki Kobayashi
2006.5.28-6.4 Geometry and Representation Theory: A Conference in honor of George Lusztig: Masaki Kashiwara
2006.1.1-1.6 Sixtieth Birthday Conference in honor of Roger Howe at National Univ.of Singapore: Toshiyuki Kobayashi
2006.1.8-1.13 Sixtieth Birthday Conference in honor of Roger Howe at National Univ.of Singapore: Masaki Kashiwara
2005.10.10-10.14 Symposium「Algebraic Geometry in East Asia. II」at Hanoi Institute of Mathematics: Kyoji Saito
2005.7.20-7.24 Asian Mathematical Conference 2005 at National Univ.of Singapore: Shigeru Mukai
2005.7.20-7.24 Asian Mathematical Conference 2005 at National Univ.of Singapore: Masaki Kashiwara
2005.6.2-6.7 4th Japanese-Hungarian Symposium on Discrete Mathematics and its Applications, at R¥'enyi Institute: Satoru Fujishige

10

Grants-in-Aid for Scientific Research

YEAR	2000	2001	2002	2003	2004	2005	2006
TOTAL (thousand yen)	38,300	46,400	56,600	61,600	77,700	68,800	66,800
NUMBER	24	26	32	39	43	46	43



11

"21st Century Center of Excellence" Program
Formation of an International Center of Excellence in the Frontiers of Mathematics and Fostering of Researchers in Future Generations

- The Program is "to cultivate a competitive academic environment among Japanese universities by giving targeted support to the creation of world-standard research and education bases. **...**"
- Joint proposal of RIMS with Dept. of Math. "Formation of an International Center of Excellence in the Frontiers of Mathematics and Fostering of Researchers in Future Generations" (M. Kashiwara Program Leader) was adopted in 2003.
- See the detailed accounts in "Reports on Self-evaluation (August 2006)", pp. 46—57.

12

Cooperative Research

- Funds are allocated by the Government for carrying out cooperative research.
- Proposals (for conferences, workshops, joint researches, research visitors for at least two weeks, etc.) are invited annually from throughout the country. Screened by the Technical Committee whose members are chosen from throughout the country on the basis of recommendations such as those from the Science Council of Japan.
- RIMS Research Project,

13

International Research Activities

- International conferences, symposia and workshops
  - RIMS Research Project since 1991
  - International conferences, symposia and workshops related to cooperative research and the "21st Century Center of Excellence" Program.
  - New style symposia modelled after the "Taniguchi Symposia" (planned)
- International visitors
- International academic exchange
- Joint Mathematical Colloquia with Dept. of Math.

14

RIMS Research Project

In **1991**, RIMS ran an international cooperative research project on the general theme "**Infinite Analysis**".
The main part of the project was a three-month long workshop, the proceedings of which consisted of 47 original papers.
Since then a project of the same kind has been held every year at RIMS.

The Research Projects are not yet institutionalized so that no specific funds for them are allocated by the Government.

15

RIMS Research Projects (since 1991)

1991 Mathematical Analysis of Infinite Degree of Freedom
1992 Unstable and Turbulent Motion of Fluid
1993 Moduli spaces, Galois representations and L-functions
1994 Study of algebraic combinatorics-emphasizing connections with other branches of mathematics
1995 BRS symmetry
1996 Higher dimensional algebraic varieties
1997 Analysis on homogeneous spaces and representation of Lie groups
1998 Combinatorial methods in the representation theory and related combinatorics
1999 Geometry related to string theory

16

2000 Reaction-diffusion systems: Theories and Applications

2001 Low-Dimensional Topology in the Twenty-first Century

2002 Stochastic Analysis and Related Topics

2003 Complex Dynamics

2004 Method of Algebraic Analysis in Integrable Systems

2005 Mathematics of the Navier-Stokes Equations and its Applications

2006 (1) Arithmetic Algebraic Geometry

(2) Theoretical Effectivity and Practical Effectivity of Grobner Bases

2007 Mirror Symmetry and Topological Field Theory

2008 Discrete Structures and Algorithms

18

International conferences in the academic year 2006
(cf. Report on Self-evaluation (August 2006), pp.10--20)

- **Algebraic, Analytic and Geometric Aspects of Complex Differential Equations and their Deformations. Painlevé Hierarchies** 2006.5.15-5.20
- **Dynamical Systems and Applications: Recent Progress** 2006.7.24-7.28
- **KIAS-RIMS joint workshop on Computer Algebra--Efficient Computation of Gröbner Bases and Mathematical Algorithms Based on It--** 2006.7.31-8.3 RIMS Project Research (2)
- **Stochastic Analysis and Applications** 2006.9.11-9.15
- **Arithmetic algebraic geometry** 2006.9.11-9.14 RIMS Project Research (1)
- **Arithmetic Galois Theory and Related Moduli Spaces** 2006.10.23-10.31 RIMS Project Research (1)
- **p-adic arithmetic geometry** 2006.11.20-11.22 RIMS Project Research (1)
- **Geometry and analysis on complex algebraic varieties** 2006.12.11-12.15
- **Theoretical Effectivity and Practical Effectivity of Gröbner Bases** 2006.1.22-1.26 RIMS Project Research (2)

19

International symposia and workshop in new style modelled after the “Taniguchi Symposia” (planned)

Small scale “retreat” combined with larger scale open symposia.

As are listed below, Taniguchi Symposia since 4th in 1977 through 41st in 1997 were held in “retreat” style with about 15 top level young participants, half from Japan and another half from overseas, each followed by a larger scale symposium (very often at RIMS) open to the mathematical community in general.

According to the Proceedings of the final Taniguchi Conference on Mathematics held in Nara 1998,

20

Mr. Taniguchi “was convinced that the value of limiting the number of participants in order to allow maximum flow of communication and personal contact. ・・・・・・ it was his dream to provide a forum where promising young scholars the world over may gather informally to exchange their thoughts, thereby contributing to mutual understanding, peace and the development of mankind in the world of future”.

21

Taniguchi Symposia in Mathematics and accompanying larger scale symposia open to the mathematical community in general

1. “Theory of finite groups”, Hokkaido Univ. 1974.9.1—7; RIMS 1974.9.9—10.
2. “Algebraic number theory” (Takagi Centennial), RIMS 1976.3.22—29.
3. “Algebraic geometry”, RIMS 1977.1.10—14.

---

4. “Probability and analysis”, Katata (15 participants);
Related symposium at RIMS 1977.8.19—25.
5. “Geometric function theory”, Katata (17 participants), 1978.9.1—6;
“Geometric theory of several complex variables”, RIMS 1978.9.7—9.
6. “Non-linear problems in geometry”, Katata (18 participants)1979.9.3.—8;
“Global analysis and geometry”, RIMS 1979.9.10—12.
7. “Topics in singularities”, Katata (18 participants) 1980.9.3—9.
“Complex analysis of singularities”, RIMS 1980.9.10—12.
8. “Functional analysis in Markov processes”, Katata (16 participants)
1981.8.21—26;
“Markov processes and analysis”, RIMS 1981.8.27—29.
9. “Commutative algebra”, Katata (16 participants) 1981.9.3—7;
“Commutative algebra” RIMS 1981.9.10—12.
10. “Stochastic analysis”, Katata (15 participants) 1982.7.1—7;
“Sochastic analysis and its applications”, RIMS 1982.7.8—10.

22

11. “Classification of algebraic and analytic manifolds”, Katata (16 participants)1982.7.7—13; “Algebraic geometry”, Kobe 1982.7.15—13.
12. “Algebraic groups and their representations”, Katata (15 participants) 1983.8.29—9.3; “Algebraic groups and related topics”, RIMS 1983.9.5—7.
13. “Automorphic forms of several complex variables”, Katata (16 participants)1983.9.5—10; “Automorphic functions and number theory”, Univ. Tokyo 1983.8.31—9.2.
14. “Hyperbolic equations and related topics”, Katata (16 participants) 1984.8.27—31; “Hyperbolic equations and related topics”, RIMS 1984.9.3—5.
15. “Structure theory of non-linear integrable differential and difference systems”, Katata (15 participants) 1984.9.3—6; “Topics in non-linear analysis”, RIMS 1984.8.30—9.1.
16. “Probabilistic methods in mathematical physics”, Katata (15 participants) 1985.6.20—26; “Probabilistic methods in mathematical physics”, RIMS 1985.6.27—29.
17. “Curvature and topology of Riemannian manifolds”, Katata (17 participants) 1985.8.26—31; “Problems in Riemannian geometry in the large”, RIMS 1985.9.2—4.
18. “Analysis on homogeneous spaces”, Katata (18 participants) 1986.8.25—30; “Analysis on homogeneous spaces and representations of Lie groups”, RIMS 1986.9.1—3, Hiroshima Univ. 1986.9.5—7.
19. “Class numbers and fundamental units”, Katata (15 participants) 1986.6.24—28; “Algebraic number theory”, RIMS 1986.6.30—7.3.
20. “Complex analytic theory of differential equations”, Katata (16 participants) 1987.8.17—22; “Complex analytic theory of differential equations”, RIMS 1987.8.24—27.

23

21. “Geometry and analysis on manifolds”, Katata (15 participants)1987.8.24—29; “Analysis on manifolds”, RIMS 1987.8.31—9.2.
22. “Solvable models in statistical mechanics and quantum field theory”, Katata (19 participants) 1988.10.24—28; “Integrable models in field theory and statistical mechanics”, RIMS 1988.10.17—21.
23. “Birational geometry of algebraic varieties” Katata (19 participants) 1988.8.22—27; “Recent topics on algebraic varieties”, RIMS 1988.8.29—31.

（1988　Taniguchi Conf. at Katata Lake Biwa）

24

24. “Non-linear partial differential equations and their applications”, Katata (16 participants) 1989.8.23—29; “Non-linear partial differential equations and their applications”, RIMS 1989.8.30—9.2.
25. “Prospects in complex geometry”, Katata (15 participants), 1989.7.31—8.5; “Advances and prospects in complex geometry”, RIMS 1989.8.7—9.
26. “Asymptotic problems in probability theory”, Sanda (16 participants), 1990.8.31—9.5; “Asymptotic problems in probability theory”, RIMS 1990.9.6—8.
27. “Einstein metrics and Yang-Mills connections”, Sanda (16 participants) 1990.12.6—11; OSAKA international conference on complex geometry and related topics” held in commemoration of 50th anniversary of Osaka University, sponsored by Osaka University and Taniguchi Foundation. Osaka 1990.12.13—18.
28. “Special differential equations”, Katata (17 participants) 1991.8.26—31; “Special differential equations”, RIMS 1991.9.1—5.
29. “Arithmetical algebraic geometry”, France (18 participants) 1991.7.7—13; “Arithmetic algebraic geometry”, Univ. Tokyo 1992.3.23—25.
30. “Spectral and scattering theory”, Sanda (15 participants) 1992.11.16—20; “Spectral and Scattering theory”, RIMS 1992.11.24—26.
31. “Field theory and low-dimensional topology”, Sanda (18 participants) 1993.1.4—10; “3-4 dimensional topology and field theory”, RIMS 1993.1.12—14.
32. “Operator algebras”, Kyoto (16 participants) 1993.7.5—10; “Operator algebra”, RIMS 1993.7.12—14.

25

33. “Symplectic geometry and quantization problems”, Sanda (17 participants) 1993.7.11—17; “Symplectic geometry and its applications”, Keio Univ.1993.7.21—24.
34. “New trends in stochastic analysis”, England (16 participants) 1994.9.21—27; “Taniguchi symposium”, Univ. Warwick 1994.9.28—30.
35. “Moduli of vector bundles”, Sanda (17 participants)1994.12.11—16; “Moduli of vector bundles”, RIMS 1994.12.19—22.
36. “Structure of solutions of differential equations”, Katata (18 participants) 1995.6.26—30; “Algebraic analysis”, RIMS 1995.7.3—7.
37. “Topology and Teichmueller spaces”, Finland (17 participants)1995.7.24—28; “The Nevanlinna Colloquim”, Univ. of Joensuu, 1995.8.1—5.
38. “Topological field thoery, primitive forms and related topics”, Kyoto (16 participants) 1996.12.9—13; “Topological Field theory and related topics”, RIMS 1996.12.16—19.
39. “Analytic number theory”, Kyoto (14 participants) 1996.5.12—18; “Analytic number theory” RIMS 1996.5.20—24.
40. “Analysis and geometry in several complex variables”, Katata (15 participants) 1997.6.23—28; “Analysis and geometry in several complex variables”, RIMS 1997.6.30—7.3.
41. “Integrable systems and algebraic geometry”, Kobe (14 participants) 1997.6.30—7.5; “Integrable systems and algebraic geometry”, RIMS 1997.7.7—11.

Taniguchi Conference on Mathematics, Nara '98
1998.12.15—20. Nara.

26

International Visitors

- Three international visiting professorship positions are authorized by the Government with allocated funds.
- Through JSPS Grants-in-Aid and 21st Century COE program
- International Post-doctoral Fellows (JSPS and 21st Century COE program)

The number (at most 12) of international visiting professors invited each for over 3 months

8 (2002), 9 (2003), 8 (2004), 9 (2005), 9 (2006)

For the list, see "Report on Self-evaluation (August 2006)", pp. 25—30.

27

International Visitors through JSPS Grants-in-Aid, 21st Century COE Programs, etc.

Year / Country	'00	'01	'02	'03	'04	'05	'06
Australia	9	6	7	1	9	3	3
Canada	8	3	9	2	3	10	5
China	10	22	17	10	16	14	11
Denmark	1	2	0	4	0	3	1
France	11	18	19	34	33	28	52
Germany	18	20	23	25	18	21	35
India	3	3	0	1	4	3	5
Italy	8	10	12	10	8	5	10
Korea	13	19	19	23	10	35	37
Russia	17	17	16	28	32	13	19
Sweden	0	3	2	4	3	1	1
U.K.	16	8	8	7	7	13	13
U.S.A.	33	41	22	26	25	39	64
Others	47	72	64	51	95	50	63
Total (people)	194	244	218	226	263	238	319

28

The number of International Post-Doctoral Fellows through JSPS Grants and 21st Century COE program

	JSPS	
year	people	
1997	1	
1998	3	
1999	5	
2000	5	
2001	6	
2002	2	21st COE
2003	1	2
2004	3	2
2005	0	3
2006	2	4

29

International Speakers at the Joint Weekly Mathematical Colloquium with Dept. of Math. (Academic Year 2006)

- Alexander Stoimenow（Kyoto Univ. RIMS）: May 10, 2006
- Alan Weinstein（UC Berkeley）: May 24, 2006
- Leon Takhtajan（SUNY at Stony Brook）: May 31, 2006
- Pavle Pandzic（University of Zagreb）: June 21, 2006
- Gopal Prasad（University of Michigan）: July 26, 2006
- Pawel Pilarczyk（Kyoto Univ. the Dept. of Sci.）: November 1, 2006
- Raphael Rouquier（Leeds Univ.）: November 22, 2006
- Harris J. Silverstone（Johns Hopkins Univ. & RIMS, Kyoto Univ.）: January 31,2007

30

International Academic Exchange Program for Young Mathematicians with Seoul National University through 21st Century COE Program

① **November 21, 2003**
at Daikaigi-shitsu, Dept. of Math., Kyoto Univ.

② **September 15-17, 2004**
at Sangsan building 101, Dept of Math., Seoul National Univ.

③ **February 21-22, 2006**
at Daikaigi-shitsu, Dept. of Math., Kyoto Univ.

④ **February 13-14, 2007**
at Dept. of Math., Seoul National Univ.

31

③ Seoul National Univ. — Kyoto Univ. Exchange Program for Young Mathematicians

Date: February 21-22, 2006
Place: Daikaigi-shitsu, Dept. of Math., Kyoto Univ.

Speakers :
Dongho Byeon （Number Theory） Jaigyoung Choe （Diff. Geom.）
Hyeonbae Kang （PDE） Jongil Park （Topology）
Kazuya Kato （Number Theory） Shigeru Mukai （Alg. Geom.）

Poster Session: Japanese 13, Korean 10



32

International Academic Exchange Agreements

- Korea Institute for Advanced Study (KIAS)
  since March 10, 2000
- Seoul National University (SNU),
  Dept. of Mathematical Sciences
  since March 10, 2000

33

Supporting Activities and Facilities

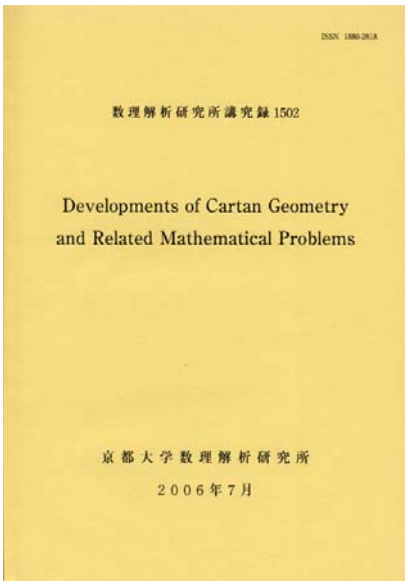
- Publications
  - "RIMS Kôkyûroku"
  - New Lecture Notes Series "RIMS Kôkyûroku Bessatsu"
  - Publications RIMS
  - RIMS Preprint Series
  - Bulletin
- Library
- Office Space
- Research Support Sections
- Accommodation

34

RIMS Kôkyûroku

Number of Issues

Year	Number
2002	57
2003	50
2004	60
2005	53
2006	65

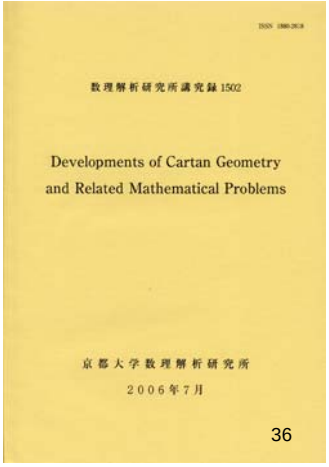


35

On-line Publication of RIMS Kôkyûroku

Kyoto Univ. Repository
http://repository.kulib.kyoto-u.ac.jp/dspace/

RIMS web page
http://www.kurims.kyoto-u.ac.jp/
kyodo/kokyuroku/backnumber.html



36

“RIMS Kôkyûroku Bessatsu“(ISSN: 1881-6193)

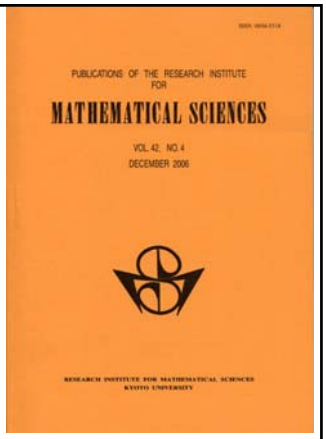
Each volume will be the proceedings of a conference held at RIMS.
The Advisory Board of RIMS selects about 10 conferences to publish their proceedings in this new series from the conferences held at RIMS every year.

RIMS Kôkyûroku Bessatsu B1:
Kyoto Conference on the Navier-Stokes Equations and their Applications
(Y. Giga, H. Kozono, H. Okamoto and Y. Shibata, eds.)
March, 2007, 408 pages, 1600 Yen+shipping

RIMS Kôkyûroku Bessatsu B2:
Algebraic, Analytic and Geometric Aspects of Complex Differential Equations and their Deformations. Painlevé hierarchies
(Y. Takei, ed.)
March, 2007, 269 pages, 1000 Yen+shipping

37

Publications RIMS (on-line versions and special issues)



Project Euclid Vol. 37 (2001)-Vol. 42 (2006)
http://projecteuclid.org/Dienst/UI/1.0/Home

To Appear in J-STAGE Vol. 1 (1965)
http://www.journalarchive.jst.go.jp/japanese

Special Issues

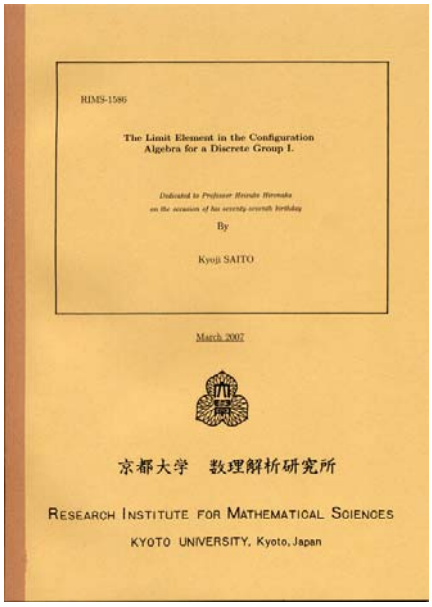
- **“40th Anniversary Commemorative Articles”**
  Vol.40, No.3, September 2004 and No.4, December 2004, 826 pp, 28 articles
- **“Thirty Years of the Double Exponential Transforms”**
  Vol.41, No.4, December 2005, 186 pp, 10 articles
- **“Hironaka Special Issue”**
  Vol.44, No.1, March 2008, in preparation
- **“Arithmetic Algebraic Geometry”**
  Vol.45, No.1, March 2009, in preparation

38

RIMS Preprint Series

(since 1964)

Year	Issues
1998	39
1999	47
2000	45
2001	38
2002	42
2003	51
2004	43
2005	42
2006	50



39

Bulletin (published annually)

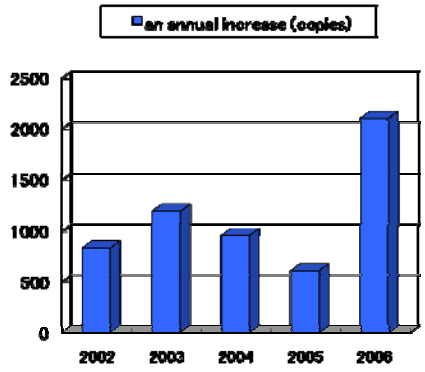
in Japanese

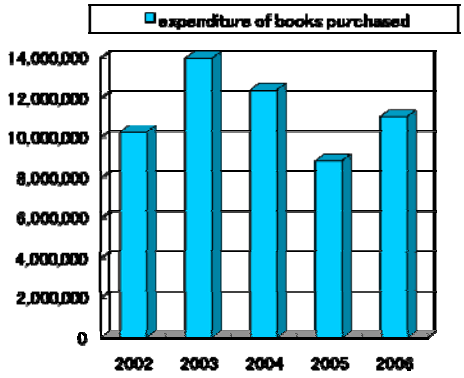
in English

40

Library

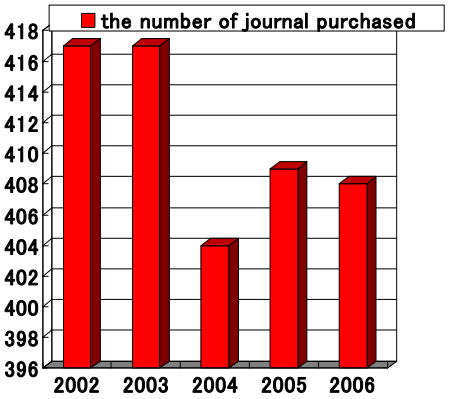
	2002	2003	2004	2005	2006
An annual increase (copies)	837	1,187	959	609	2,097
Expenditure of books purchased (yen)	10,249,533	13,954,977	12,332,958	8,807,784	11,030,889
A number of collection books (copies)	77,824	78,024	78,983	79,592	81,689

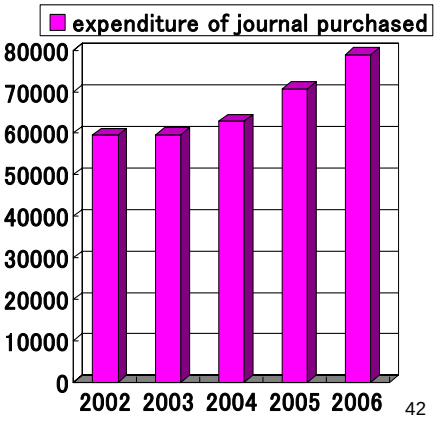




41

	2002	2003	2004	2005	2006
the number of journal purchased	417	417	404	409	408
expenditure of journal purchased (yen)	59,562,000	59,632,000	62,827,000	70,703,000	78,934,000





42

Office Space and Accomodations

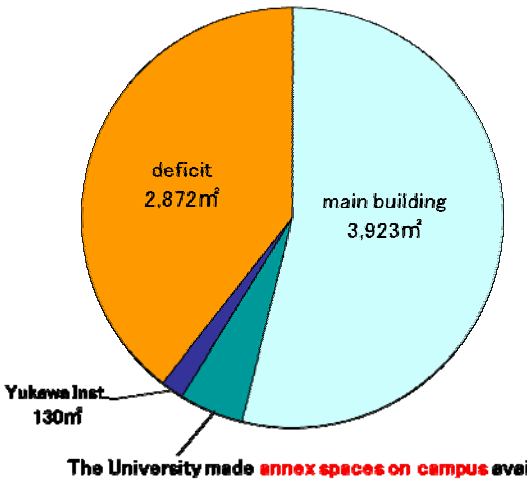
SECTION	LAND	BUILDING	
		Built area	Floor space
RIMS Main Building	㎡ 1,310	㎡ 777	㎡ 3,923
Yukawa Inst. (rented)			130 (4 rooms)
Former Fac. of Eng. Bldg. No.7 ＊ (provisional use) (till June 2007)			325 (7 rooms)
Former Fac. of Eng. Bldg. No.5 ＊ (in renovation) (permanent use) (from February 2008 on)			360 (8 rooms)
TOTAL			4,378 (till June 2007)
			4,413 (from February 2008)
Kitashirakawa Guest House	262	137	453

＊ The University made annex space on campus available to RIMS in connection with the adoption of the 21st COE program.

43

Required space according to the “Government standard”

7, 285㎡



The University made annex spaces on campus available to RIMS in connection with the adoption of the 21st COE program. .
360㎡

44

Research Support Sections

1. “Cooperative research service section” supports cooperative research activities including accounting and various publications.

2. The Secretariat is a section which provides secretarial services for the RIMS members and deals with the Publications and preprints. The website at http://www.kurims.kyoto-u.ac.jp is maintained by this section.

3. The Scientific Exchange Program Office (SEPO) handles international relations and offers secretarial services to overseas visitors as well as to those who attend the international symposia or workshops held at RIMS.

45

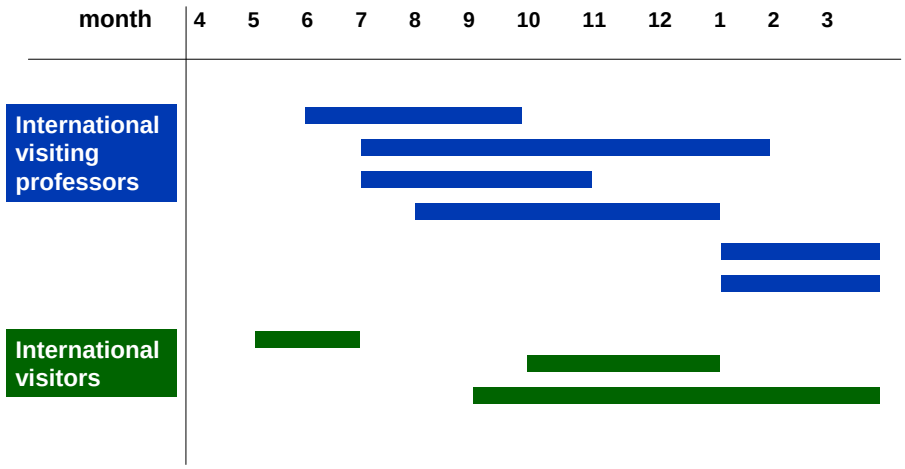
Accommodation

1. Shugakuin International House
   Housing for visitors to Kyoto University

2. Kitashirakawa Guest House
   (Kitashirakawa Gakusha)
   for visitors to RIMS or YITP only.
   Very inexpensive. (¥2,570/ day)

46

Shugakuin International House (RIMS, 2006)

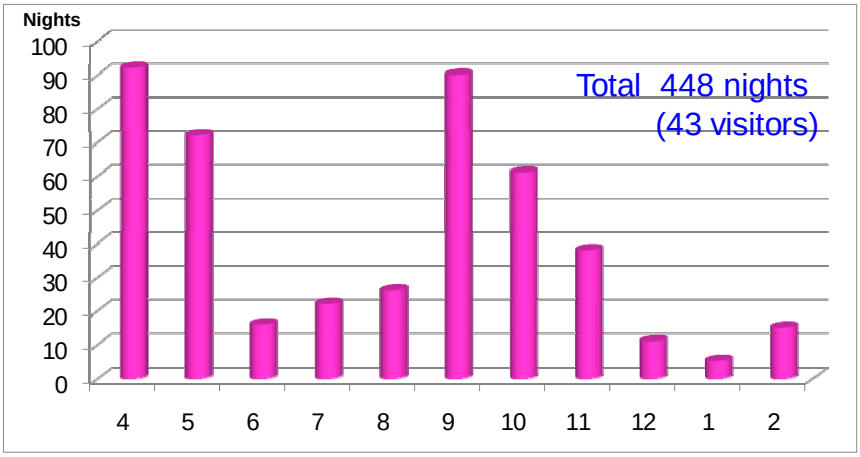


47

Kitashirakawa Guest House (RIMS, 2006)

RIMS, jointly with the Yukawa Institute of Theoretical Physics, provides inexpensive accommodations.

Number of International visitors



Outreach activities

RIMS lectures to the public--- Introduction to mathematics --- (since 1976)

The 26th August 2 -- August 6, 2004 participants 95 (total 322)
- **T. Ohtsuki : Can you undo this knot ?**
- **T. Ooura : Formulas and algorithms for computing pi**
- **S. Mukai : Topics on invariant polynomials**

The 27th August 1 -- August 5, 2005 participants 71 (total 260)
- **K. Habiro : Topology of 3-manifolds**
- **T. Suzuki : Mathematics of braids**
- **S. Fujishige : Submodular structures and discrete convexity**

The 28th July 31 -- August 4, 2006 participants 74 (total 237)
- **K. Ohkitani : Vector analysis, differential equation and fluid dynamics**
- **M. Abe : Topics on Kunz rings**
- **A. Tamagawa : Galois theory and its development**

49

Lectures for freshmen of Kyoto Univ. 2006
Modern Mathematics and Mathematical Sciences
--- Basic Concept and its application to other disciplines ---

April 14 **K. Habiro** Jones polynomials of knots
April 21 **T. Kumagai** Martingale program and its application --optimal strategy of games and pricing of optional transactions
April 28 **H. Okamoto** Topics on Newton(-Raphson) method: from numerical solutions to the existence of solutions of differential equations
May 12 **K. Saito** Periods of integrals
May 19 **S. Fujishige** Discrete algorithms and their mathematical analysis
May 26 **T. Kobayashi** Symmetries
June 2 **S. Ariki** Why do so many enumerations coincide? --Introduction to Kashiwara crystal
June 9 **M. Hasegawa** Recurrent programs
June 16 **K. Ohkitani** Geometric properties of fluid equations
June 23 **T. Kawai** Birth and growth of the theory of hyperfunctions --from Dirac's delta to micro-local analysis
July 7 **M. Kawakita** Introduction to algebraic geometry
July 14 **A. Tamagawa** Finite fields and arithmetic geometry

50

CRFMS

- Center for Research at the Frontiers of Mathematical Science:
  - a center in RIMS created in 2006 to meet promptly recent trends in mathematical sciences
  - two professors in Japan on sabbatical leave were accepted in 2006

51

Incompatibility of the functions under the new system of national universities introduced in 2004

- The existence of RIMS is guaranteed only if it is mentioned in the 6-year plan of the university submitted to the Government.
- As a cooperative research institute it aims at maximizing benefit for the mathematical research community at large, while each university aims at maximizing benefit for its own specific interests.
- The budget request of RIMS to the Government can be proposed only through the university.
- The government allocates funds for RIMS as parts of the funds for the university without earmarking. The university may (and really does) subtract some portion to balance funding for other divisions of the university.
- In the current budget system, RIMS has difficulty in getting funds to enlarge the buildings of RIMS, which is indispensable for it to function smoothly and effectively not only as a cooperative research institute but also as an international research center of excellence.

52

Future Prospects

- Closer relations with international institutions
- Balance of faculties in “Pure mathematics” and “Applied mathematics”
- Have a new building (700 ㎡ increase in two years)
- Establish a more solid research supporting structure

53