ARCUS Rhône-Alpes –Brésil 2008 – 2010
Volet « Mathématiques »
Rapport d'activité
20/02/2011

Le volet « Mathématiques » du programme de coopération ARCUS Rhône-Alpes – Brésil s'est donné pour objectif de renforcer les collaborations existantes (Rhône-Alpes - Brésil) par des actions ciblées dans le domaine de la formation permanente des jeunes chercheurs – principalement doctorants ou jeunes docteurs, mais aussi étudiants avancés de master – à l'occasion d'écoles ou d'ateliers concentrés sur deux ou trois semaines. Pour des raisons d'efficacité, nous avons choisi soit de soutenir des activités récurrentes existantes (Écoles thématiques brésiliennes, École d'été de mathématiques de l'Université Joseph Fourier), soit d'organiser des ateliers spécialisés spécifiques au programme ARCUS.

Le tableau ci-dessous comporte la liste des activités soutenues entre 2008 et 2010 (les détails financiers feront l'objet d'un document complémentaire dès que les derniers remboursements seront finalisés).

Année	Pays et Intitulé de l'activité scientifique	Modalités du soutien ARCUS et Co-financements
2008	Brésil : XV École de géométrie différentielle (Fortaleza, CE)	Participation de deux conférenciers rhônalpins : P. Bérard (UJF) et G. Besson (CNRS). *Financement* : ARCUS. XV École de géométrie différentielle.
2008	Brésil : XII École de probabilités (Ouro-Preto, MG)	Participation d'un doctorant rhônalpin : A. Fribergh (UCBL). *Financement* : ARCUS. XII École de probabilités, FAPESP.
2008	France : École d'été de mathématiques (Grenoble)	Participation de deux doctorants brésiliens : A. Peres (UFMG) et F.X. Pena (IMPA). *Financement* : ARCUS et École d'été de mathématiques.
2009	**Activité spécifique ARCUS.** Brésil : Atelier « Géométries » (Rio de Janeiro, RJ). Mini-cours et conférences. Activité organisée dans le cadre de l'année de la France au Brésil.	Participation de trois conférenciers rhônalpins in situ : P. Bérard (UJF), G. Besson (CNRS), H. Pajot (UJF). Conférences à distance (visio-conférence) : J.P. Demailly, Ph. Eyssidieux, E. Peyre (UJF). *Financement* : ARCUS (conférenciers rhônalpins et accueil en stage à l'Institut Fourier de jeunes chercheurs brésiliens. IMPA (participation de doctorants et jeunes chercheurs brésiliens à la manifestation).
2009	France : École d'été de mathématiques (Grenoble) et Congrès « Théorie spectrale et géométrie »	Participation de neuf jeunes chercheurs ou doctorants brésiliens : A. Bazan (UFRJ), M. Cavalcante (UFAL), F. Elbert (UFRJ), L. Fusaro (UFMG), E. Gonçalves (UNICAMP), D. Jane (IMPA), W. Neves (UFRJ), O. Santana (UNICAMP), M. Telichenevski (UFRGS). *Financement* : ARCUS (jeunes chercheurs et doctorants brésiliens). UJF et CNRS (participation de quatre conférenciers brésiliens sur financement : M. do Carmo, F. Coda, R. Sa Earp, W. Santos).
2009	Brésil : Autres activités scientifiques (Rio de Janeiro, RJ).	Participation d'un conférencier rhônalpin : P. Bérard (UJF). *Financement* : MIRA 2008 et CNPq.

2010	**Activité spécifique ARCUS.** Brésil : Atelier de Dynamique des fluides, I (Campinas, SP).	Participation de conférenciers et doctorants rhônalpins : C. Audiard (UCBL), M. Bonnivard (U. Savoie), L. Brandolese (UCBL), R. Fares (U. Saint Etienne), T. Gallay (UJF). *Financement* : ARCUS & CNPq, FAPESP, CNRS.
2010	France : École d'été de mathématiques (Grenoble)	Participation de trois doctorants brésiliens : Nobili (IMPA), Nogueira (UFF), Santos (IMPA). *Financement* : ARCUS et École d'été de mathématiques.
2010	**Activité spécifique ARCUS.** France : Atelier de Dynamique des fluides, II (Lyon)	Participation de jeunes mathématiciens brésiliens : A. Bronzi (UNICAMP), C. Mondaini (UFRJ), E. Pinto de Moura (UNICAMP), A. Presoto (UNICAMP), R. Ramos (UFRJ), M. Souza (UFF), L. Viana (UEC), H. Viglioni (USP). *Financement* : ARCUS & CNRS, FAPESP, UCBL.
2010	**Activité spécifique ARCUS.** Brésil : Atelier de Géométrie algébrique (Rio de Janeiro, RJ)	Participation de conférenciers rhônalpins : S. Druel (CNRS), E. Peyre (UJF) B. Rémy (UCBL), A. Thuillier (UCBL). *Financement* : ARCUS & IMPA, CAPES, IUF (B. Rémy).
2010	Brésil : Formation continue des doctorants (IMPA, UFRGS, UNICAMP)	Participation d'un prédoctorant rhônalpin : A. Gerolin (ENSL). *Financement* : ARCUS et institutions d'accueil.
2010	Brésil : École de probabilités et physique mathématique – Clay Institute (Buzios, RJ)	Participation d'un doctorant rhônalpin : N. Sonigo (ENSL). *Financement* : ARCUS et École de probabilités.
2010	**Activité spécifique ARCUS.** Brésil : Atelier Analyse géométrique (Rio de Janeiro, RJ)	Participation de mathématiciens rhônalpins pour des mini-cours, L. Bessières (UJF), Z. Djadli (UJF), et des conférences, P. Bérard (UJF), G. Besson (CNRS), V. Bour, C.W. Chen, A. Deruelle, T. Richard (doctorants UJF). *Financement* : ARCUS & ANR, MathAmSud (participants rhônalpins). IMPA (participation de doctorants et jeunes chercheurs brésiliens ou étrangers ; participation au financement conférenciers rhônalpins).
2011	Brésil : Écoles d'été à UFAL (Maceio, AL) et UFC (Fortaleza, CE).	Participation de conférenciers rhônalpins : L. Bessières 5UJF), G. Besson (CNRS), Z. Djadli (UJF). *Financement* : ARCUS et UFAL, UFC.

L'École d'été de mathématiques – EEM est organisée annuellement par l'Institut Fourier depuis 1992. Elle dure trois semaines et comporte des cours de niveau doctoral (1ère semaine), post-doctoral (2nde semaine) et une session spécialisée la troisième semaine. Les cours et les conférences sont données par des spécialistes internationaux de la thématique (les thématiques étaient respectivement, *Méthodes géométriques en théorie des représentations* en 2008, *Transport optimal – Théorie et applications* en 2009, *Aspects arithmétiques des courbes rationnelles* en 2010). Elle est principalement financée par l'Université Joseph Fourier et par le CNRS, et reçoit des subventions de la Région Rhône-Alpes et de la Ville de Grenoble. Elle accueille en particulier des jeunes chercheurs (pré-doctorants à post-doctorants) et des

spécialistes venant du monde entier. Le programme ARCUS Rhône-Alpes – Brésil a permis d'accueillir des doctorants et des jeunes chercheurs brésiliens dont la participation n'aurait pas pu être financée autrement. Voir la page de l'école, http://www-fourier.ujf-grenoble.fr/-Ecole-d-ete-.html , pour plus de détails et pour les notes de cours des dernières sessions.

La communauté mathématique brésilienne a une longue tradition d'organisation d'écoles thématiques. Elles comportent traditionnellement des cours de niveau master et doctorat et des exposés avancés. Elles sont financées par les deux grandes agences brésiliennes de recherche, CNPq et CAPES, ainsi que par les agences de certains états, FAPERJ, FAPESP. Elles peuvent ainsi réunir un large public d'étudiants (master, doctorat) et de jeunes chercheurs, autour de spécialistes brésiliens et internationaux. Le programme ARCUS Rhône-Alpes – Brésil a facilité la participation de mathématiciens et de doctorants rhônalpins à certaines de ces écoles.

Le programme ARCUS Rhône-Alpes – Brésil a également permis *l'organisation d'évènements scientifiques spécifiques* (ateliers comportant des mini-cours et des conférences) dans des domaines traditionnels de coopération franco-brésilienne (Géométrie différentielle, Dynamique des fluides), mais aussi dans des domaines émergents au Brésil et bien représentés en Région Rhône-Alpes (Géométrie algébrique et Géométrie Arithmétique). Quatre évènements spécifiques ont ainsi pu être réalisés, pour lesquels nous donnons un rapport d'activité plus détaillé en Annexes 1 à 4 (Annexe 1 : *Géométries*, atelier organisé à l'IMPA dans le cadre de l'Année de la France au Brésil en 2009 ; Annexe 2 : *Dynamique des fluides*, deux ateliers organisés à Campinas et à Lyon en Janvier et juillet 2010 respectivement ; Annexe 3 : *Géométrie algébrique*, atelier réalisé à l'IMPA en octobre 2010 ; Annexe 4 : *Analyse géométrique*, atelier réalisé à l'IMPA en novembre 2010, en collaboration avec un projet de recherche Math AmSud). Ces ateliers ont bénéficié d'un soutien financier important des partenaires brésiliens (CAPES, CNPq, FAPESP, IMPA en particulier).

Le programme a débuté en Avril 2008 pour une durée de trois ans. Fin 2010, les crédits mis à notre disposition par la Région Rhône-Alpes étaient complètement utilisés. Les crédits mis à notre disposition par le Ministère des affaires étrangères et européennes présentaient un reliquat qui a été engagé dans la poursuite du programme scientifique début 2011 avec la participation de trois spécialistes grenoblois à des écoles d'été à Maceió et à Fortaleza, conformément avec ce qui avait été envisagé lors des comités de pilotage du programme ARCUS.

Ce rapport sera finalisé et accompagné d'un bilan financier précis lorsque les dernières opérations scientifiques auront été réalisées (fin février 2011) et les derniers remboursements de mission effectués. Version actuelle : V2, 20/02/2011.

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ANNEXE 1

Geometrias **Géométries**

IMPA et PUC-Rio
13 – 17 avril 2009

Rapport d'activité

L'événement "Geometrias Géométries" a été organisé conjointement par l'Université Joseph Fourier (Institut Fourier, UMR 5582 UJF/CNRS) et l' Instituto nacional de Matemática Pura e Aplicada (IMPA, Rio de Janeiro) et labellisé dans le cadre du programme de l'Année de la France au Brésil. Il faisait partie de la programmation scientifique 2009 du programme ARCUS Région Rhône-Alpes – Brésil (2008-2010).

L'événement était destiné aux mathématiciens – chercheurs, doctorants et étudiants avancés de master – intéressés par différents aspects de la géométrie. L'objectif était de renforcer les liens existants entre la communauté mathématique brésilienne et l'Institut Fourier et de les étendre à de nouvelles thématiques de recherche, en particulier au niveau de la formation doctorale ou postdoctorale.

Le programme était constitué de deux phases, mini-cours et conférences au Brésil d'une part, séjours de recherche à Grenoble dans le cadre de l'école d'été de mathématiques 2009 d'autre part.

impa

INSTITUTO NACIONAL DE MATEMÁTICA PURA E APLICADA

Geometrias

Géométries

INSTITUT FOURIER

IMPA/PUC-Rio, Rio de Janeiro
13 a 17 de Abril de 2009

O evento "Geometrias" se dirige a matemáticos, pesquisadores, alunos de doutorado e alunos avançados de mestrado interessados em Geometria sob diversos pontos de vista. As atividades estão inseridas na programação do Ano da França no Brasil; algumas serão transmitidas em tempo real pela Internet e algumas estarão disponivéis em vídeo no site do IMPA.

A primeira fase, em abril de 2009, constará de três mini-cursos no IMPA e de conferências gerais no IMPA e na PUC-Rio, ministrados por matemáticos da Universidade Joseph Fourier, Grenoble. Apoio financeiro para a estadia será oferecido a pesquisadores e alunos visitantes que queiram participar desta fase.

Na segunda fase serão oferecidas bolsas para a participação de jovens matemáticos brasileiros em atividades de pesquisa em Grenoble. São 3 bolsas com duração de até três meses entre junho e novembro de 2009, e 5 bolsas para participação na Escola de Verão "Optimal transportation, theory and applications", de 15 junho a 3 julho de 2009. As candidaturas deverão ser submetidas até 15 de Abril de 2009.

Mini-cursos - IMPA
vídeos disponíveis no site do IMPA

Spectral problems on Riemannian manifolds
por Pierre Bérard, 13 a 15 de abril, 10h30-12h

Rigidity theorems and applications - From Mostow's theorem to the growth of groups
por Gérard Besson, 13 a 15 de abril, 13h30-15h

Quasiconformal geometry and Mostow rigidity
por Hervé Pajot, 13 a 15 de abril, 15h30-17h

Conferências no IMPA
transmitidas de Grenoble pela Internet, 16 Abril, 9h30-14h30

Entire curves and algebraic differential equations, *por Jean-Pierre Demailly*
Uniformization in several complex variables, *por Philippe Eyssidieux*
Arithmetics under influence, *por Emmanuel Peyre*

Conferências na PUC-Rio
17 Abril, 9h30-12h30

The differentiable sphere theorem (after Brendle-Schoen & Boehm-Wilking), *por Gérard Besson*
Quasi-conformal geometry and hyperbolic groups -The Cannon conjecture, *por Hervé Pajot*

mais informações: **DAC - IMPA**
fax 21 2529 5019 geometrias@impa.br
http://www.impa.br/opencms/pt/eventos/store/evento_0906

Apoio financeiro
ARCUS Rhône-Alpes - Brésil
CNRS
Ministère des affaires étrangères et européennes
Région Rhône-Alpes
Université Joseph Fourier

França.Br 2009

O Ano da França no Brasil - 21 de abril a 15 de novembro de 2009 é organizado:
- Na França, pelo Comissariado Geral Francês, o Ministério das Relações Exteriores e Européias, o Ministério da Cultura e da Comunicação e por Culturesfrance.
- No Brasil, pelo Comissariado Geral Brasileiro, o Ministério da Cultura e o Ministério das Relações Exteriores.

UNIVERSITÉ JOSEPH FOURIER, GRENOBLE &
IMPA - INSTITUTO NACIONAL DE MATEMÁTICA PURA E APLICADA

La première phase s'est déroulée à l'IMPA et à la Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio), du 13 au 17 avril 2009. Elle était constituée de trois mini-cours (IMPA) et de deux conférences (PUC-Rio) in situ ainsi que de trois conférences retransmises depuis Grenoble vers l'IMPA en visio-conférence.

Mini-cours (IMPA)

- ✓ Spectral problems on Riemannian manifolds
  Pierre Bérard, 13/04 – 15/04, 10:30AM-12:00AM

- ✓ Rigidity theorems and applications - From Mostow's theorem to the growth of groups
  Gérard Besson, 13/04 – 15/04, 1:30PM-3:00PM

- ✓ Quasiconformal geometry and Mostow rigidity
  Hervé Pajot, 13/04 – 15/04, 3:30PM-5:00PM

Les mini-cours ont été filmés et retransmis en direct sur internet par l'IMPA. Les vidéos sont disponibles sur la page http://www.impa.br/opencms/pt/eventos/store_old/evento_0906?link=5

Conférences (IMPA, en visio-conférence depuis Grenoble 16/04, 9:30AM-2:30PM)

- ✓ Entire curves and algebraic differential equations
  Jean-Pierre Demailly

- ✓ Uniformization in several complex variables
  Philippe Eyssidieux

- ✓ Arithmetics under influence
  Emmanuel Peyre

Les vidéos sont disponibles sur la page
http://www.impa.br/opencms/pt/eventos/store_old/evento_0906?link=5
Les présentations sont disponibles sur la page
http://www.impa.br/opencms/pt/eventos/extra/2009_geometrias/apresentacoes_trabalhos

Conférences (PUC-Rio, 17/04, 9:30AM-12:30AM)

- ✓ The differentiable sphere theorem (after Brendle-Schoen & Boehm-Wilking)
  Gérard Besson

- ✓ Quasi-conformal geometry and hyperbolic groups - The Cannon conjecture
  Hervé Pajot

Participants : Il y a eu 56 participants, dont 20 non-originaires de l'état de Rio de Janeiro. Les jeunes mathématiciens brésiliens pouvaient recevoir une aide financière pour participer à l'événement. Sur 29 demandes reçues, 15 aides ont été accordées (en dehors des conférenciers). La liste des participants figure en Annexe I.

Séjours de recherche à l'Institut Fourier

Des bourses pour participer à l'école d'été de mathématiques 2009 (Institut Fourier, Grenoble) ou pour effectuer un séjour de recherche à l'Institut Fourier ont été offertes aux participants de l'événement. Onze candidatures ont été reçues et examinées dans leur ensemble. Certains candidats n'avaient pas participé à l'événement **"Geometrias Géométries".** Ont été finalement accordées six bourses (trois docteurs, trois étudiants de master ou de doctorat) et trois aides partielles (deux docteurs, un étudiant de doctorat), dont cinq à des participants de l'évènement. La liste des bénéficiaires est données en Annexe II.

Réalisation de l'événement

La réalisation de l'événement "Geometrias Géométries" a bénéficié du soutien logisitique de l'IMPA, tant sur le plan administratif (gestion des inscriptions et demandes de soutien financier, confection et diffusion d'une affiche, site web) que sur le plan informatique (mise en œuvre de la prise de vues et de la transmission des vidéos sur internet, mise en œuvre de la transmission par visio-conférence depuis Grenoble). À Grenoble, elle a aussi bénéficié du soutien de l'Institut Fourier et de l'UFR-IMAG pour la transmission par visio-conférence.

Le professionalisme et l'expérience de l'équipe informatique de l'IMPA sont pour beaucoup dans le succès technique de l'opération. L'expérience acquise sera sans nul doute très utile à l'Institut Fourier pour entrer dans une phase opérationnelle de cyber-université.

Soutien financier

L'organisation de l'événement "Geometrias Géométries" a bénéficié du soutien financier de différentes institutions ou programmes :

- ✓ IMPA (aide au séjour de participants brésiliens, cf. Annexe I, et séjours de G. Besson et H. Pajot).
- ✓ Institut Fourier (soutien direct du laboratoire).
- ✓ Ministère des affaires étrangères et européennes (via le Programme ARCUS Rhône-Alpes – Brésil).
- ✓ Région Rhône-Alpes (séjour de P. Bérard – bourse de mobilité MIRA 2008 et via le programme ARCUS Rhône-Alpes – Brésil).

Le soutien financier ci-dessus porte à la fois sur l'organisation matérielle de l'événement et sur les bourses pour permettre à de jeunes mathématiciens brésiliens de participer à l'école d'été de mathématiques 2009 à l'Institut Fourier.

Le détail du budget est donné en Annexe III.

Diffusion de l'information

La diffusion de l'information relative à l'événement "Geometrias Géométries" a été assurée par différents moyens :

- ✓ Sites web
  - http://www-fourier.ujf-grenoble.fr/~pberard/BRFR09/brfr09.html
  - http://www.impa.br/opencms/pt/eventos/store_old/evento_0906
- ✓ Affiche (diffusée dans les départements de mathématiques au Brésil).
- ✓ Annonce sur le site de la SMB – Sociedade brasileira de matemática.
- ✓ Annonce dans la revue "Matemática universitária".
- ✓ Annonces et articles dans le journal de la PUC-Rio.
- ✓ Listes de diffusion par courriel (IMPA, programme ARCUS Rhône-Alpes – Brésil).

Le détail figure en Annexe IV.

Organisation

Pierre Bérard (Université Joseph Fourier),
Lúcio Rodriguez (IMPA), Ricardo Sá Earp (PUC-Rio).

Avenir

Une opération similaire va être organisée en 2010 dans le cadre des activités scientifiques du programme ARCUS Rhône-Alpes – Brésil. Dans la continuation des conférences retransmises par internet depuis Grenoble, elle portera sur la *géométrie algébrique* et implique

- ✓ côté français l'Institut Camille Jordan (UMR UCBL/CNRS, B. Rémy) et l'Institut Fourier (UMR UJF/CNRS, S. Druel et E. Peyre),
- ✓ côté brésilien l'IMPA, Rio de Janeiro (C. Araújo), l'Universidade Federal Fluminense, Niteroi (N. Medeiros) et l'Universidade Federal de Minas Gerais, Belo Horizonte (I. Vainsencher).

L'objectif est de renforcer les échanges entre les communautés mathématiques au Brésil et en Rhône-Alpes, en particulier au niveau des jeunes chercheurs et des étudiants (master, doctorat).

Annexe I
Liste des participants de l'événement "Geometrias Géométries"

Colonne de droite, surlignés, participants hors état de Rio de Janeiro. Colonne de gauche, surlignés, participants ayant bénéficié d'un soutien financier.

Nom	Institution
Acir Carlos da Silva Junior	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Ady Cambraia Júnior	Pontifícia Universidade Católica do Rio de Janeiro (PUC-RJ)
Aldo Amilcar Bazán Pacoricona	Universidade Federal do Rio de Janeiro (UFRJ)
Aldo Peres Campos e Lopes	Universidade Federal de Minas Gerais (UFMG)
Alfredo Hipólito Gonzalez	Facultad de Matemática, Astronomía y Física (Argentine)
Almir Rogério Silva Santos	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Ana Lucia Pinheiro Lima	Universidade Federal da Bahia (UFBA)
Ana Maria Menezes de Jesus	Universidade Federal de Alagoas (UFAL)
Ana Paula Teles de Oliveira	Universidade Estadual do Sudoeste da Bahia (UESB)
Arturo Ulises Fernandez Perez	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Augusto Ritter Stoffel	Universidade Federal do Rio Grande do Sul (UFRGS)
Carlos Nemer	Instituto Politécnico do Rio de Janeiro (UERJ - IPRJ)
Celso Soares de Souza	Colegio Estadual Santos Dias (CESD)
Cesar Camacho	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Claudemir Silvino Leandro	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Clayton de Lima	Universidade Federal Rural do Rio de Janeiro (UFRRJ)
Cristhabel	Universidade Federal Fluminense (UFF)
Cristina Levina Marques	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Deise Mara Barbosa de Almeida	Universidade Federal Rural do Rio de Janeiro (UFRRJ)
Fábio Luiz Borges Simas	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Flávio França Cruz	Universidade Federal do Ceará (UFC)
Gabriel Calsamiglia	Universidade Federal Fluminense (UFF)
Gérard Besson	Université Joseph Fourier (UJF)
Gregório Manoel da Silva Neto	Universidade Federal de Alagoas (UFAL)
Hervé Pajot	Universite de Grenoble (UJF)
Heudson Tosta Mirandola	Universidade Federal do Espirito Santo (UFES)
Hilário Alencar da Silva	Universidade Federal de Alagoas (UFAL)
Isnaldo Isaac	Universidade Federal de Alagoas (UFAL)
James Daniel Trevarton Jane	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Juan Fernando Zapata	Instituto de Matemática e Estatística - USP-São Paulo (USP)
Leandro Aguiar Fernandes	Instituto Politécnico do Rio de Janeiro (UERJ - IPRJ)
Lia Feital Fusaro	Universidade Federal de Minas Gerais (UFMG)
Lino Anderson da Silva Grama	Universidade Estadual de Campinas (UNICAMP)
Lucio Ladislao Rodriguez	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Luiz Felipe Nascimento Soares	Universidade do Estado do Rio de Janeiro (UERJ)

Márcio Henrique Batista da Silva	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Marco Pacini	University of Roma "la Sapienza" (Roma)
Marcos Petrúcio de Almeida Cavalcante	Universidade Federal de Alagoas (UFAL)
Maria de Andrade Costa	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Martim Lourenço de Oliveira Vieira	Centro Brasileiro de Pesquisas Físicas (CBPF)
Miriam Telichevesky	Universidade Federal do Rio Grande do Sul (UFRGS)
Murilo Chavedar de Souza Araújo	Universidade Federal da Paraiba – João Pessoa (UFPB)
Nicolas Puignau	Instituto Nacional de Matemática Pura e Aplicada (IMPA)
Olivâine Santana de Queiroz	Universidade Estadual de Campinas (UNICAMP)
Paulo Roberto Lopes Soares	Universidade da Amazônia (UNAMA)
Pierre Bérard	Université Joseph Fourier (UJF)
Rafael Oswaldo Ruggiero Rodriguez	Pontifícia Universidade Católica do Rio de Janeiro (PUC-RJ)
Rodrigo Pereira Carvalho	Universidade do Estado do Rio de Janeiro (UERJ)
Sergio Licanic	Universidade Federal Fluminense (UFF)
Tatiana Ferreira Monteiro	Faculdade de Filosofia, Ciências e Letras de Duque de Caxias (FEUDUC)
Thiago Hartz Maia	Centro Brasileiro de Pesquisas Físicas (CBPF)
Tiago Caúla Ribeiro	Universidade Federal do Ceará (UFC)
Ulisses Lima Parente	Universidade Federal do Ceará (UFC)
Verónica Susana Diaz	Universidad Nacional de Córdoba (Argentine)
Viviana del Barco	Universidad Nacional de Rosario (Argentine)
Walcy Santos	Universidade Federal do Rio de Janeiro (UFRJ)

Annexe II

Liste des participants de l'événement "Geometrias Géométries" ayant bénéficié d'une bourse de recherche à l'Institut Fourier

- ✓ Marcos Cavalcante, Docteur. Professeur UFAL, Maceió (École d'été 2009 ; actuellement en postdoctorat à l'Institut Fourier).
- ✓ Lia Fusaro, Master. UFMG, Belo Horizonte (École d'été 2009).
- ✓ Dan Jane, Docteur. Postdoctorant IMPA, Rio de Janeiro (Congrès "Théorie spectrale et géométrie" et École d'été 2009).
- ✓ Olivaine Santana, Docteur. Postdoctorant UNICAMP, Campinas (École d'été 2009).
- ✓ Miriam Telichenevsky, Master. URGS, Porto Alegre (École d'été 2009).

Autres mathématiciens brésiliens accueillis à l'Institut Fourier dans le cadre de l'École d'été de mathématiques 2009

- ✓ Aldo Bazan, doctorant. UFRJ, Rio de Janeiro.
- ✓ Fernanda Elbert, Docteur. Professeur UFRJ, Rio de Janeiro.
- ✓ Eduardo Gonçalves, Master. UNICAMP, Campinas.
- ✓ Wladimir Neves, Docteur. Professeur UFRJ, Rio de Janeiro.

Annexe III

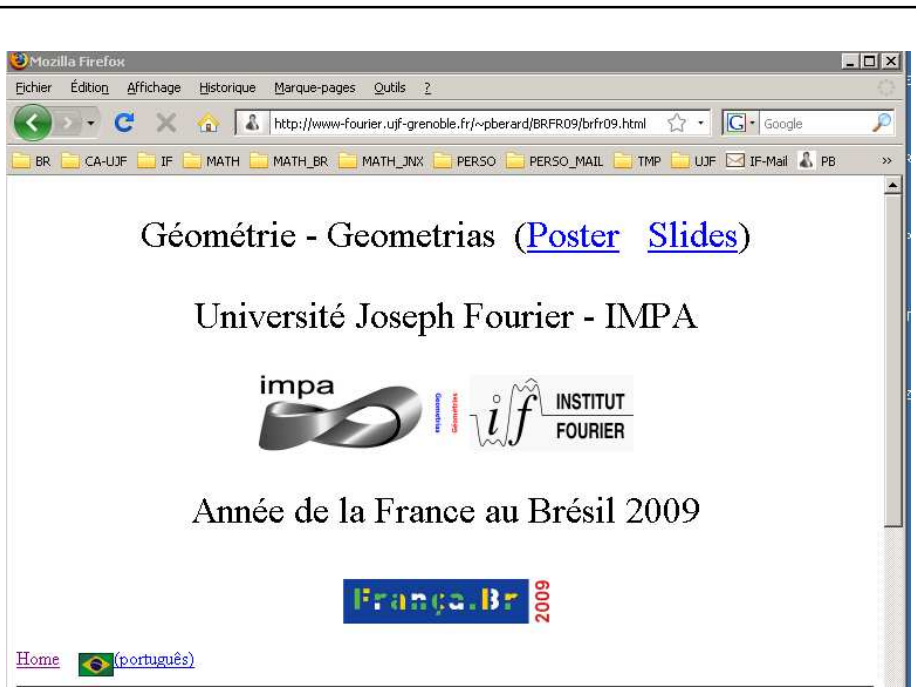
Budget "Geometrias Géométries"

Dépenses	Euros	Financeur
Avion / Besson & Pajot	2 700	Arcus Brésil
Séjour / Besson & Pajot (3.420 R$)	1 140	IMPA
Avion Bérard	1 100	MIRA 2008
Séjour / Bérard	1 500	MIRA 2008
Bourses locales / participants brésiliens hors Rio (13.500 R$)	4 500	IMPA
Cinq bourses de recherche à Grenoble (cf. Annexe II, première liste)	6 860	Arcus Brésil
Total dépenses	**17 800**	
Recettes		
ARCUS RRhA – Brésil / Geometrias	9 560	ARCUS
Bourse P. Bérard MIRA Ens. Supérieur 2008	2 600	MIRA 2008
Soutien financier IMPA	5 640	IMPA
Total recettes	**17 800**	

Annexe IV

Communication et diffusion de l'information

Communication



IMPA - Instituto Nacional de Matemática Pura e Aplicada - Mozilla Firefox

Fichier Édition Affichage Historique Marque-pages Outils ?

http://www.impa.br/opencms/pt/eventos/store_old/evento_0906

BR CA-UJF IF MATH MATH_BR MATH_JNX PERSO PERSO_MAIL TMP UJF IF-Mail PB

Ano da França no Brasil - Geometrias

IMPA, Rio de Janeiro, de 13/04 até 17/04

O evento "Geometrias" se dirige a matemáticos, pesquisadores, alunos de doutorado e alunos avançados de mestrado interessados em geometria de vários pontos de vista. As atividades estão inseridas no Ano da França no Brasil; as palestras serão transmitidas em tempo real pela Internet e algumas estarão disponíveis posteriormente em video no site do IMPA. Este evento está sendo co-organizado pelo IMPA e pela Université Joseph Fourier, Grenoble.
Existe a possibilidade de apoio financeiro para pesquisadores e alunos visitantes.
A Université Joseph Fourier oferece ainda bolsas para a participação de jovens matemáticos brasileiros em atividades de pesquisa em Grenoble. Candidaturas devem ser submetidas até 30/04/2009.

Organizadores

Certificados

Programa

Apresentações dos Trabalhos

Videos e Internet

Inscrição Online e Auxílios

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impa

INSTITUT FOURIER

Eventos
Ano da França no Brasil - Geometrias

Program

Abstracts

Lectures and Videos

Mini-Courses

Spectral problems on Riemannian manifolds
Pierre Bérard, 04/13 to 04/15, 10:30AM-12:00AM

Rigidity theorems and applications - From Mostow's theorem to the growth of groups
Gérard Besson, 04/13 to 04/15, 1:30PM-3:00PM

Quasiconformal geometry and Mostow rigidity
Hervé Pajot, 04/13 to 04/15, 3:30PM-5:00PM

Lectures at IMPA
Transmitted from Grenoble, 04/16, 9:30AM-2:30PM

Entire curves and algebraic differential equations
Jean-Pierre Demailly

Uniformization in several complex variables
Philippe Eyssidieux

Arithmetics under influence
Emmanuel Peyre

Lectures at PUC-Rio
04/17, 9:30AM-12:30AM

The differentiable sphere theorem (after Brendle-Schoen & Boehm-Wilking)
Gérard Besson

Quasi-conformal geometry and hyperbolic groups - The Cannon conjecture
Hervé Pajot

França.Br 2009

Ano da França no Brasil - Geometrias

IMPA, Rio de Janeiro, de 13/04 até 17/04

Videos e Internet

13/04/2009

Pierre Bérard: Spectral problems on Riemannian manifolds
Gérard Besson: Rigidity theorems and applications - From Mostow's theorem to the grow of groups
Hervé Pajot: Quasiconformal geometry and Mostow rigidity

14/04/2009

Pierre Bérard: Spectral problems on Riemannian manifolds
Gérard Besson: Rigidity theorems and applications - From Mostow's theorem to the grow of groups
Hervé Pajot: Quasiconformal geometry and Mostow rigidity

15/04/2009

Pierre Bérard: Spectral problems on Riemannian manifolds
Gérard Besson: Rigidity theorems and applications - From Mostow's theorem to the grow of groups
Hervé Pajot: Quasiconformal geometry and Mostow rigidity

16/04/2009

Jean-Pierre Demailly: Entire curves and algebraic differential equations
Philippe Eyssidieux: Uniformization in several complex variables
Emmanuel Peyre: Arithmetics under influence

Voltar

impa

INSTITUTO NACIONAL DE MATEMÁTICA PURA E APLICADA

Geometrias

Géométries

INSTITUT FOURIER

IMPA/PUC-Rio, Rio de Janeiro
13 a 17 de Abril de 2009

O evento "Geometrias" se dirige a matemáticos, pesquisadores, alunos de doutorado e alunos avançados de mestrado interessados em Geometria sob diversos pontos de vista. As atividades estão inseridas na programação do Ano da França no Brasil; algumas serão transmitidas em tempo real pela Internet e algumas estarão disponíveis em vídeo no site do IMPA.

A primeira fase, em abril de 2009, constará de três mini-cursos no IMPA e de conferências gerais no IMPA e na PUC-Rio, ministrados por matemáticos da Universidade Joseph Fourier, Grenoble. Apoio financeiro para a estadia será oferecido a pesquisadores e alunos visitantes que queiram participar desta fase.

Na segunda fase serão oferecidas bolsas para a participação de jovens matemáticos brasileiros em atividades de pesquisa em Grenoble. São 3 bolsas com duração de até três meses entre junho e novembro de 2009, e 5 bolsas para participação na Escola de Verão "Optimal transportation, theory and applications", de 15 junho a 3 julho de 2009. As candidaturas deverão ser submetidas até 15 de Abril de 2009.

Mini-cursos - IMPA
vídeos disponíveis no site do IMPA

Spectral problems on Riemannian manifolds
por Pierre Bérard, 13 a 15 de abril, 10h30-12h

Rigidity theorems and applications - From Mostow's theorem to the growth of groups
por Gérard Besson, 13 a 15 de abril, 13h30-15h

Quasiconformal geometry and Mostow rigidity
por Hervé Pajot, 13 a 15 de abril, 15h30-17h

Conferências no IMPA
transmitidas de Grenoble pela Internet, 16 Abril, 9h30-14h30

Entire curves and algebraic differential equations, *por Jean-Pierre Demailly*
Uniformization in several complex variables, *por Philippe Eyssidieux*
Arithmetics under influence, *por Emmanuel Peyre*

Conferências na PUC-Rio
17 Abril, 9h30-12h30

The differentiable sphere theorem (after Brendle-Schoen & Boehm-Wilking), *por Gérard Besson*
Quasi-conformal geometry and hyperbolic groups -The Cannon conjecture, *por Hervé Pajot*

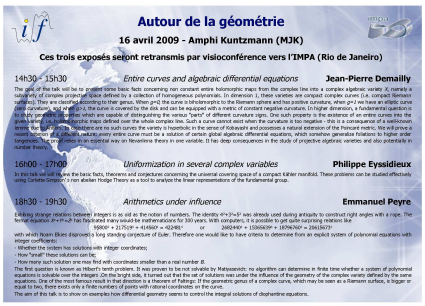
mais informações: DAC - IMPA
fax 21 2529 5019 geometrias@impa.br
http://www.impa.br/opencms/pt/eventos/store/evento_0906

Apoio financeiro
ARCUS Rhône-Alpes - Brésil
CNRS
Ministère des affaires étrangères et européennes
Région Rhône-Alpes
Université Joseph Fourier

França.Br 2009

O Ano da França no Brasil - 21 de abril a 15 de novembro de 2009 é organizado:
- Na França, pelo Commissariado Geral Francês, o Ministério das Relações Exteriores e Europeias, o Ministério da Cultura e da Comunicação e por Culturesfrance
- No Brasil, pelo Commissariado Geral Brasileiro, o Ministério da Cultura e o Ministério das Relações Exteriores.

UNIVERSITÉ JOSEPH FOURIER, GRENOBLE &
IMPA - INSTITUTO NACIONAL DE MATEMÁTICA PURA E APLICADA



Autour de la géométrie

16 avril 2009 - Amphi Kuntzmann (MJK)

Ces trois exposés seront retransmis par visioconférence vers l'IMPA (Rio de Janeiro)

14h30 - 15h30 *Entire curves and algebraic differential equations* **Jean-Pierre Demailly**

The goal of the talk will be to present some basic facts concerning non constant entire holomorphic maps from the complex line into a complex algebraic variety X, namely a subvariety of complex projective space defined by a collection of homogeneous polynomials. In dimension 1, these varieties are compact complex curves (i.e. compact Riemann surfaces). They are classified according to their genus. When g=0 the curve is biholomorphic to the Riemann sphere and has positive curvature; when g=1 we have an affine curve (zero curvature), and when g>1 the curve is covered by the disk and can be equipped with a metric of constant negative curvature. In higher dimension, a fundamental question is to find positive quantities which are capable of distinguishing the various "parts" of different curvature signs. One such property is the existence of an entire curves into the variety. Brunella showed that if the canonical bundle is ample, then there are no such curves. Conversely, Green-Griffiths conjectured that if the canonical bundle is not ample, then there are such curves the variety is hyperbolic in the sense of Kobayashi and possesses a natural extension of the Poincaré metric. We will prove a recent theorem of a difficult nature: every entire curve must be a solution of certain global algebraic differential equations, which somehow generalize holomorphic differentials in an essential way in Nevanlinna theory in one variable. It has deep consequences in the study of projective algebraic varieties and also potentially in number theory.

16h00 - 17h00 *Uniformization in several complex variables* **Philippe Eyssidieux**

In this talk we will review the basic facts, theorems and conjectures concerning the universal covering space of a compact Kähler manifold. These problems can be studied effectively using Carlotta Simpson's non abelian Hodge Theory as a tool to analyze the linear representations of the fundamental group.

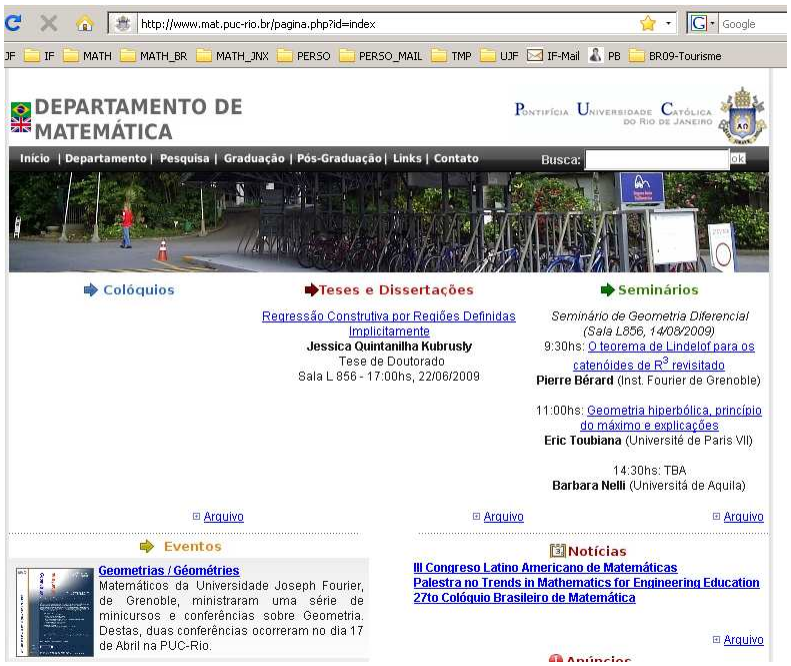
18h30 - 19h30 *Arithmetics under influence* **Emmanuel Peyre**

Striking strange relations between integers is as old as the notion of numbers. The identity $4^4+3^4=5^4$ was already used during antiquity to construct right angles with a rope. The formal equation $x^n+y^n=z^n$ has fascinated many would-be mathematicians for 300 years. With computers, it is possible to get quite surprising relations like

$$19800 + 21757^4 = 414640 = 42486^4 \quad \text{or} \quad 2682440^4 + 15366639^4 + 18796760^4 = 20615673^4$$

with which Noam Elkies disproved a long standing conjecture of Euler. Therefore one would like to have criteria to determine from an explicit system of polynomial equations with integer coefficients:
- Whether the system has solutions with integer coordinates;
- How "small" these solutions can be.

The first question is known as Hilbert's tenth problem. It was proven to be not solvable by Matiasevich: no algorithm can determine in finite time whether a system of polynomial equations is solvable over the integers. On the bright side, it turned out that the set of solutions was under the influence of the geometry of the complex variety defined by the same equations. One of the most famous result in that direction is a theorem of Faltings: if the geometric genus of a complex curve, which may be seen as a Riemann surface, is bigger or equal to two, there exists only a finite numbers of points with rational coordinates on the curve.
The aim of this talk is to show on examples how differential geometry seems to control the integral solutions of diophantine equations.



Nº 984

6 a 12 de abril de 2009

Geometrias

Em comemoração ao Ano da França no Brasil, o Departamento de Matemática da PUC-Rio promoverá o encontro Geometrias, de segunda-feira, 13 de abril, a sexta-feira, 17, para matemáticos, pesquisadores, alunos de doutorado ou avançados de mestrado interessados em vários pontos de vista da geometria. Participam da organização, o Instituto Nacional de Matemática Pura e Aplicada (Impa) e a Université Joseph Fourier, de Grenoble, França. Inscrições podem ser feitas pela internet, no site www.impa.br.

• Programação:

13 a 15 de abril – minicursos no IMPA: *Spectral problems on Riemannian manifolds*, por Pierre Bérard, das 10h30m às 12h; *Rigidity theorems and applications - from Mostow's theorem to the growth of groups*, por Gérard Besson, das 13h30m às 15h e *Quasiconformal geometry and Mostow rigidity*, por Hervé Pajot, das 15h30m às 17h. As palestras serão transmitidas em tempo real pelo site do IMPA.

16 de abril – palestras transmitidas de Grenoble pela Internet no site do IMPA, das 9h30m às 14h30m: *Entire curves and algebraic differential equations*, por Jean-Pierre Demailly; *Uniformization in several complex variables*, por Philippe Eyssidieux e *Arithmetics under influence*, por Emmanuel Peyre.

17 de abril – palestras na Sala 856-L da PUC-Rio, das 9h30m às 12h30m: *The differentiable sphere theorem (after Brendle-Schoen & Boehm-Wilking)*, por Gérard Besson e *Quasi-conformal geometry and hyperbolic groups -The Cannon conjecture*, por Hervé Pajot.

PUC urgente
Nº 985 13 a 19 de abril de 2009

Matemática em projeto interativo

Pierre Berard, professor da universidade francesa Joseph Fourier (UFJ), está na PUC como professor visitante no Departamento de Matemática por três meses. Ele está promovendo o projeto *Geometrias*, que integra os alunos de Matemática da PUC aos da UFJ por meio de palestras interativas, transmitidas pela internet em tempo real. O projeto começou em Grenoble, na França, e terminará com palestras na PUC nesta semana.

***Geometrias* é um projeto da PUC em parceria com a UFJ. Qual é o objetivo do projeto e quando ele foi desenvolvido?**
Pierre Berard - Este projeto é único no sentido de que não se repetirá. Ele foi criado em outubro, dentro da programação do Ano da França no Brasil. Nós propusemos este projeto à PUC porque achamos que essa é uma oportunidade de chamar a atenção de jovens profissionais brasileiros para a França, para que eles possam fazer cursos lá. O projeto é voltado para alunos de mestrado e doutorado de Matemática, embora professores também estejam inscritos.

Quais foram os lugares selecionados para a realização das palestras e dos minicursos?
Berard - Os minicursos serão na sede do Instituto Nacional de Matemática Pura e Aplicada (IMPA) na segunda-feira, 13, terça-feira, 14, e quarta-feira, 15, e exibidos na internet pelo site www.impa.br. Três conferências serão transmitidas de Grenoble para o IMPA na quinta-feira, 16, entre 9h30m e 14h30m, também pelo mesmo site. Na PUC, as palestras serão na sexta-feira, 17, com transmissão para a França.

As palestras na PUC serão realizadas pelos professores Gérard Bresson e Hervé Pajot. O que se pode esperar delas?
Berard - As palestras são feitas por matemáticos conhecidos no meio acadêmico. Sabemos que, para se entrar em contato com alguém, é mais fácil quando você já conhece essa pessoa, e a ideia é promover este primeiro contato. Os professores dão estas palestras sobre Matemática, em termos gerais, para que os alunos e outros colegas possam ampliar seus conhecimentos e se interessarem por possíveis intercâmbios.

Foto: Ludmila Zorzi

Como funciona a interatividade nas palestras transmitidas pela internet?
Berard - A gente vai fazer dois tipos de transmissão. O IMPA prefere fazer um vídeo que sai na internet com um *delay* de 20 a 30 segundos. Em certos casos, pode-se criar um *chat*. Outra medida que estudamos é fazer uma videoconferência, o que vai ser mais interativo. O *delay* será de aproximadamente dois segundos, e, assim, quem estiver assistindo poderá interagir diretamente com os palestrantes. De qualquer forma, os e-mails deles estão disponíveis no site.

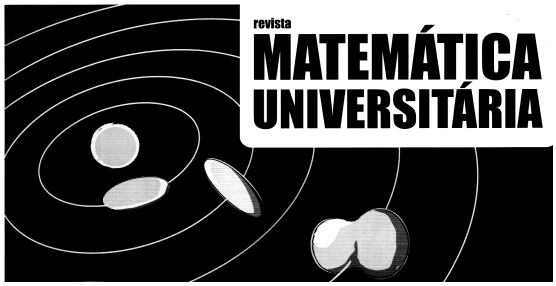
Existe um acordo-padrão entre a PUC e as Universités Grenoble, entre elas a UFJ. Como funciona este acordo?
Berard - Eu acho que todas as universidades no mundo desejam desenvolver relações internacionais. Nelas existem intercâmbios de alunos e parcerias entre pesquisadores. Em Grenoble, escolhemos alguns países como prioritários, entre eles o Brasil. Observamos com quais universidades mantemos relações científicas, e foi assim que estipulamos um acordo padrão com a PUC. Este acordo é muito curto em seu texto, e diz que ambas instituições estão interessadas em colaborar uma com a outra. Assim, podemos fazer programas específicos de intercâmbio ou pesquisa.

A UJF oferece bolsas para a participação de matemáticos brasileiros em Grenoble. De quanto tempo é esta bolsa e o que ela cobre?
Berard - Oferecemos três bolsas para um estágio de pesquisa de até três meses e cinco bolsas para o nosso curso de verão, de junho a julho. As bolsas cobrem passagem, até 1.100 euros, e parte da estadia, até 800 euros. As vagas estão abertas até dia 30 de abril, com preferência para os matemáticos que participarão do *Geometrias*.

■ *Juliana Lisboa*

SBM
Sociedade Brasileira de Matemática

http://www.sbm.org.br



Programa ARCUS Rhône-Alpes - Brésil

O programa de cooperação está em vigor, no período de 2008 a 2010, com foco em escolas de pós-graduação e workshops, com o objetivo de fomentar a colaboração entre pesquisadores dos dois países. É financiado pelo Ministério Francês de Assuntos Exteriores, pela Região Rhône-Alpes e pelas instituições participantes, envolvendo matemática, engenharia e ciências sociais. Na matemática, coordenam o programa Pierre Bérard (Université Joseph-Fourier - Grenoble) e Ricardo Sá Earp (PUC-Rio). Mais informações em *www-fourier.ujf-grenoble.fr/~pberard/BR_ARCUS/arcus.html*

Ano da França no Brasil

Em retribuição ao "Ano do Brasil na França", realizado em 2005, o ano de 2009 será o "Ano da França no Brasil", ou "França.Br 2009", acordo entre os dois países que vigorará oficialmente de 21 de abril a 15 de novembro de 2009, no qual a França apresentará, nas diferentes regiões do Brasil, sua ciência e sua cultura.

Na matemática, o evento "Geometrias" se dirigirá aos matemáticos (pesquisadores, alunos de doutorado, alunos avançados de mestrado) das equipes do Instituto do Milênio "Avanço Global e Integrado da Matemática Brasileira e Contribuições à Região" (IM-AGIMB). A primeira fase (em abril) terá três minicursos (no IMPA) e conferências gerais (no IMPA e na PUC-Rio) ministrados por matemáticos da Universidade Joseph Fourier, Grenoble.

Na segunda fase serão oferecidas bolsas para jovens matemáticos brasileiros participarem de atividades de pesquisa em Grenoble: uma temporada de até três meses entre junho e novembro ou a participação na Escola de Verão "Optimal transportation, theory and applications", que será realizada entre 15 de junho e 03 de julho. A data limite para a apresentação das candidaturas é 15 de abril. O apoio financeiro vem do Programa ARCUS Rhône-Alpes -- Brésil, do CNRS (Centre National de la Recherche Scientifique), do IMPA, do Ministère des Affaires Étrangères et Européennes, Région Rhône-Alpes, e da Université Joseph Fourier. Para mais informações, ver *www-fourier.ujf-grenoble.fr/~pberard/BRFR09/brfr09.html*

ANNEXE 2

ARCUS Rhône-Alpes -- Brésil
Supported by
Région Rhône-Alpes
and
Ministère des Affaires étrangères et européennes

Franco-Brazilian Fluids Summer Schools
January (Campinas) & July (Lyon) 2010

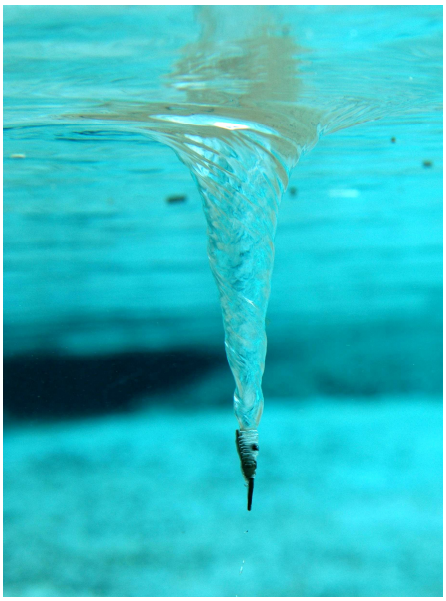
Programme Campinas
Programme Lyon
Budget

Book of Abstracts

1st Franco-Brazilian Fluids Summer School

January 13-22, 2010

IMECC-Unicamp, Campinas, SP, Brazil



Preface

The Summer School is dedicated to the subject of Fluid Dynamics and PDE, focusing on modeling and rigorous analysis of physically relevant problems in fluid dynamics, particularly highly irregular incompressible flows. The research in this field touches upon many different problems with relevant applications, such as problems in aerodynamics, oceanographic flows and geophysical flows. It is a field which has generated intense international research activity over the last two decades.

This School is designed to attract young researchers and students to the field and to foster scientific interaction among the participants. Given these goals, the School has been structured so as to have both minicourses on topics of current interest in the field and lectures on recent results. There will also be opportunity for select contributed communications.

This endeavor stems from an ongoing collaboration between researchers in France and Brazil and it is a part of a joint project between members of the Scientific Committee.

Scientific and Organizing Committee

Thierry Gallay (Université de Grenoble I)
Dragos Iftimie (Université de Lyon I)
Helena J. Nussenzveig Lopes (IMECC-UNICAMP)
Milton C. Lopes Filho (IMECC-UNICAMP)
Gabriela Planas (IMECC-UNICAMP)
Ricardo Rosa (IM-UFRJ)

Support

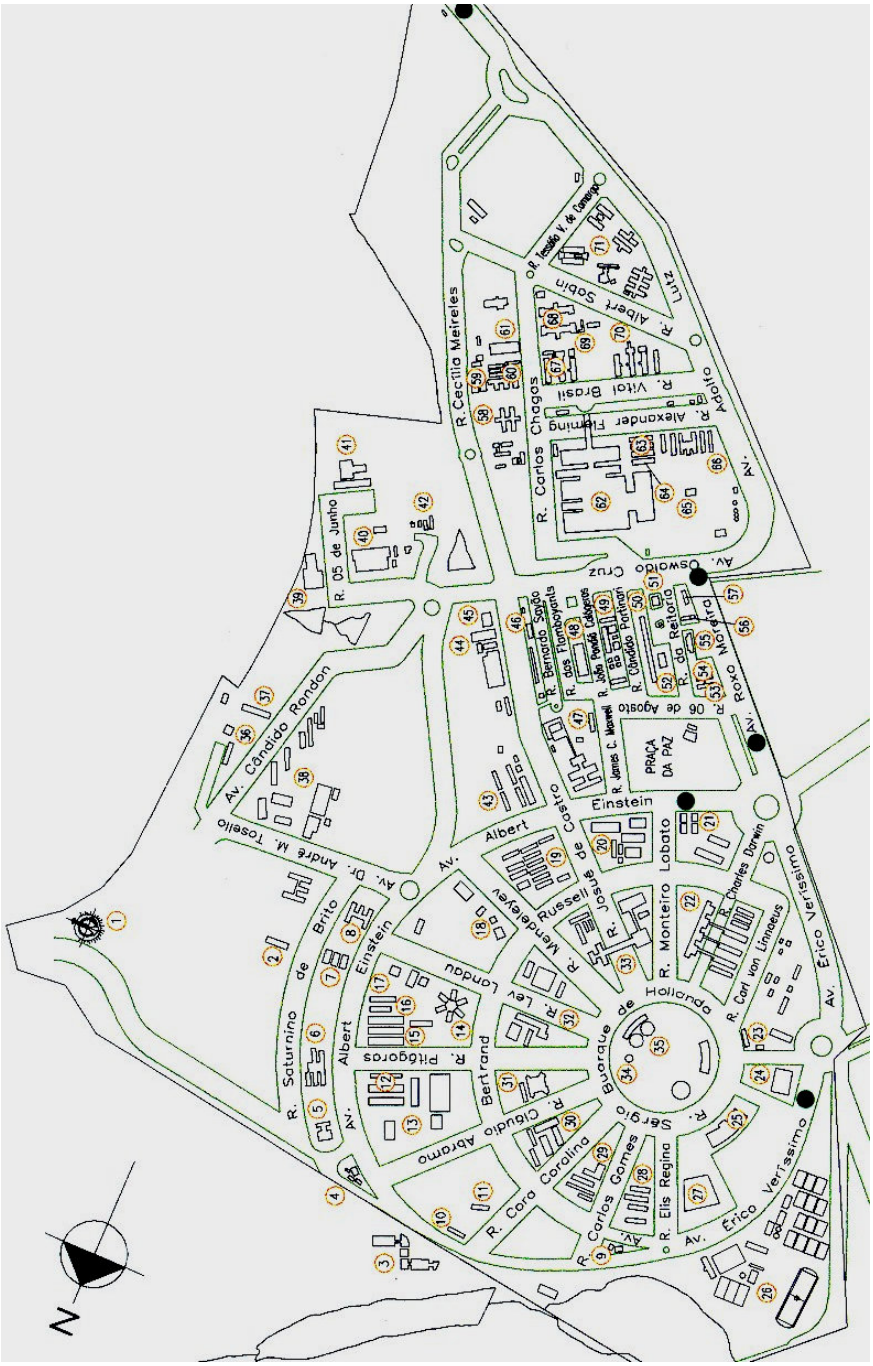
ARCUS Rhône-Alpes Brésil,
Région Rhône-Alpes & MAEE

1st Franco-Brazilian Fluids Summer School

Practical Information

Campus Information
All lectures will take place at IMECC (which stands for "Instituto de Matemática, Estatística e Computação Científica").

Campus map



IMECC is building number 31 on the map, between R. Cláudio Abramo and R. Pitágoras
CPV is building number 03

Minicourse Lecturers

Thierry Gallay (Université de Grenoble)
David Lannes (ENS Paris and Université de Bordeaux)
Milton C. Lopes Filho (IMECC-UNICAMP)
James Robinson (Warwick University)

Invited Speakers and Registered Participants

Anne Caroline Bronzi (IMECC-UNICAMP)
José Luiz Boldrini (IMECC-UNICAMP)
Lorenzo Brandolese (Université de Lyon 1)
Nikolai Vasilievich Chemetov (CMAF / Universidade de Lisboa)
Diego Cordoba (CSIC, Madrid)
Dragos Iftimie (Université de Lyon 1)
Quansen Jiu (Capitol Normal University, Beijing)
André Nachbin (IMPA-RJ)
Wladimir Neves (IM-UFRJ)
Huy-Hoang Nguyen (IMECC-UNICAMP)
César Niche (IM-UFRJ)
Dongjuan Niu (CNU Beijing and IMECC-UNICAMP)
Helena J. Nussenzveig Lopes (IMECC-UNICAMP)
Marius Paicu (Université d'Orsay)
Gabriela Planas (IMECC-UNICAMP)
Clodoaldo Ragazzo (IME-USP)
Ricardo Rosa (IM-UFRJ)
Franck Sueur (Université de Paris VI)
Alexis Vasseur (Univ. of Texas at Austin)

Program

	Wed 13	Thu 14	Fri 15	Sat 16	Sun 17	Mon 18	Tue 19	Wed 20	Thu 21	Fri 22
8:30-9:00	Registration			**Free**	**Free**					
9:00-9:30	M. Lopes	M. Lopes	M. Lopes			D. Lannes	D. Lannes	D. Lannes	Poster/ Talks	Poster/ Talks
9:30-10:30									A. Bronzi	D. Iftimie
10:30-11:00	Coffee	Coffee	Coffee			Coffee	Coffee	Coffee	Coffee	Coffee
11:00-11:50	D. Cordoba	L. Brandolese	M. Paicu			Q. Jiu	A. Nachbin	A. Vasseur	F. Sueur	H. Lopes
12:00-14:00	Lunch	Lunch	Lunch			Lunch	Lunch	Lunch	Lunch	Closure
14:00-15:30	T. Gallay	T. Gallay	T. Gallay			N. Chemetov (13:40-14:30) H. Nguyen (14:40-15:30)	J. Robinson	J. Robinson	J. Robinson	
15:30-16:00	Coffee	Coffee	Coffee			Coffee	Coffee	Coffee	Coffee	
16:00-16:50	C. Ragazzo	R. Rosa	J.L. Boldrini			C. Niche	D. Niu	Poster/ Talks	W. Neves	
17:00-17:30										
17:30-18:00	Opening Ceremony									
19:30	Reception						Dinner			

Minicourses: Room 253 – Imecc
Lectures: Auditorium – Imecc
Reception : Adunicamp - Campus
Dinner: Coxilha Grill

1st Franco-Brazilian Fluids Summer School

Minicourses

Stability and interaction of vortices in two-dimensional viscous flows
Thierry Gallay (Univ. Grenoble)

It is well-known that coherent structures, such as vortices, play a crucial role in the long-time dynamics of two-dimensional viscous flows. The aim of these lectures is to present a set of techniques which have been developed in recent years to study the nonlinear stability of a family of explicit self-similar solutions, called "Lamb-Oseen vortices". A special attention will be devoted to the large Reynolds number regime, which is most important for turbulent flows, and where interesting spectral problems arise. This stability analysis is the key for understanding the inviscid limit for point vortices, a difficult problem that has been tackled only recently, and which sheds a new light on vortex interactions. These lectures are based in part on collaborations with C.E. Wayne (Boston) and I. Gallagher (Paris 7).

Internal-Waves: Asymptotic models and instabilities
David Lannes (ENS Paris and Université de Bordeaux)

In this course, we will show how to derive models for the propagation of waves at the interface between two fluids (such structures are very common in the ocean and called internal waves). We also study an instability phenomenon that occurs for such waves: (nonlinear) Kelvin-Helmoltz instabilities.

Boundary layers and the vanishing viscosity limit for incompressible flows
Milton C. Lopes Filho (IMECC-Unicamp)

This series of lectures is a survey on results related to boundary layers and the vanishing viscosity limit for incompressible flow. The main topics covered are: a derivation of Prandtl's boundary layer equation; an outline of the rigorous theory of Prandtl's equation, without proofs; Kato's criterion for the vanishing viscosity limit; the vanishing viscosity limit with Navier friction condition; rigorous boundary layer theory for the Navier friction condition and boundary layers for flows in a rotating cylinder.

Classical theory of the Navier-Stokes equations
James Robinson (Warwick University)

The aim of this course will be to cover three outstanding results from the now classical theory of the Navier-Stokes equations, which form the starting point of any modern investigation. These results are 1) Global existence of Leray-Hopf weak solutions; 2) Criteria for regularity due to Serrin; and 3) Partial regularity results of Caffarelli-Kohn Nirenberg.

Abstracts

Solidification process: evolution with flow in molten regions

José Luiz Boldrini (IMECC-Unicamp)

We study a two-dimensional phase-field model for the evolution of a solidification/liquefaction process of pure materials in which fluid flow in non- solid regions is possible. This corresponds to a free-boundary value problem associated to a system of highly-nonlinear parabolic differential equations: a phase-field equation, a heat equation and a modified Navier-Stokes equations including a penalization term of Carman-Kozeny type and a Boussinesq term and holding only in non-solid regions. For such model we show existence of solutions in a generalized sense. This is joint work with F.P. de Souza.

Concentration of the motion inside fluid flows

Lorenzo Brandolese (Université de Lyon 1)

One of the most important questions in mathematical Fluid Mechanics, which is still far from being understood, is to know whether a finite energy and initially smooth, nonstationary, Navier-Stokes flow will always remain regular during its evolution, or can become turbulent in finite time.
As a first step toward the understanding of possible blow-up mechanisms, it is interesting to exhibit examples of smooth and decaying initial data such that, even though the corresponding solutions will remain regular, "something strange" turns out to happen around a given point (x_0, t_0) in space-time. This is the goal of the present talk.

On non-uniqueness results for the incompressible Euler equations

Anne Caroline Bronzi (IMECC - UNICAMP)

In this talk we present an outline of results concerning the non-uniqueness of weak solutions for the Euler equations. Slightly over a decade ago A. Shnirelman constructed a weak solution of the Euler equations on the 2D torus with compact support in time, which implies the non-uniqueness of weak solutions. In recent work, we used computational tools to visualize approximations for Shnirelman's flows. Jointly with Shnirelman we have modified the original construction to produce a compactly-supported (in time) weak solution with more interesting physical structure. In both constructions we have visualization of the 2D inverse cascade.
Recently, C. De Lellis and L. Székelyhidi proved non-uniqueness of weak solutions for the Euler equations in any dimension. They used a reformulation of the Euler equations as a differential inclusion together with convex integration. We extend this result to the ideal incompressible Magnetohydrodynamics equations in a special setting.

Non-linear Hyperbolic Elliptic System

Nikolai Vasilievich Chemetov (CMAF / Universidade de Lisboa)

The mean-field model for superconductive vortices in II-type superconductors is investigated in the article. The mathematical model is a nonlinear hyperbolic-elliptic system of PDEs in a given domain. Motivated by experiments, we consider physical boundary conditions, which describe a flux of superconducting vortices through the boundary of the domain. We prove the global solvability for the system. The solvability result is valid for the more general hyperbolic-elliptic system of PDEs, than we have for the mean-field model. To prove the solvability we take the limit in an approximated parabolic-elliptic system with vanishing ”viscosity”. Since the approximated solutions do not have a compactness property, we justify this limit transition, using the kinetic formulation of our problem. The main trick is that instead of the nonlinear system, we have to investigate a linear transport equation.

Contour dynamics of 2D active scalars

Diego Cordoba (CSIC, Madrid)

We will discuss several examples of 2D contour dynamics driven by an incompressible flows that present different features regarding well-posedness and regularity issues.

L^p-solutions of the steady-state Navier-Stokes with rough external forces

Dragos Iftimie (Université de Lyon 1)

In this talk we address the existence, the asymptotic behavior and stability in L^p and $L^{p,\infty}$, $3/2 < p \leq \infty$, for solutions to the steady state 3D Navier-Stokes equations with possibly very singular external forces. We show that under certain smallness conditions of the forcing term there exists solutions to the stationary Navier-Stokes equations in L^p spaces, and we prove the stability of these solutions as fixed points of the non-stationary Navier--Stokes. The non-stationary solutions can be large. We also give non-existence results of stationary solutions in L^p, for $1 \leq p \leq 3/2$. This is a joint work with L. Brandolese, C. Bjorland and M. E. Schonbek.

Axisymmetric Euler-α Equations without Swirl: Existence, Uniqueness, and Radon Measure Valued Solutions

Quansen Jiu (Capitol Normal University, Beijing)

In this talk, we will present some recent results on three-dimensional axisymmetric Euler-α equations without swirl. More precisely, we will show the global existence of weak solutions for the three-dimensional axisymmetric Euler-α equations without swirl whenever the initial unfiltered velocity v_0 satisfies $\nabla \times v_0/r$ is a finite Radon measure with compact support. And we will also prove the global existence and uniqueness in the case $\nabla \times v_0/r$ in $L^p_c(R^3)$ with $p>3/2$. This is joint with D.J. Niu, E. S. Titi and Z.P. Xin.

On the vanishing viscosity limit of helical flows

Helena Nussenzveig Lopes (IMECC - UNICAMP)

Helical flows are flows which are covariant with respect to translation along helices. In a recent paper B. Ettinger and E. Titi established global existence and uniqueness of helical flows with no "helical swirl" for the incompressible (3D) Euler equations whenever the vorticity is bounded. In earlier work, Mahalov, Titi and Leibowich had established well-posedness of helical flows for the Navier-Stokes equations, with no restriction on helical swirl. In this talk we will review these results and discuss the problem of taking the vanishing viscosity limit of helical flows with small, with respect to viscosity, helical swirl. This is joint work with M. C. Lopes Filho and Dongjuan Niu.

On the probabilistic modeling of water waves

André Nachbin (IMPA-RJ)

Recent work with collaborators has been focused on understanding how to mathematically capture the effective behavior of water waves in the presence of a highly disordered topography. Important physical phenomena are the apparent diffusion of waves, such as solitary waves, as well as the time-reversed refocusing of pulses, namely the waveform inversion of a large ocean disturbance such as a tsunami. Mathematically the talk will focus on asymptotic issues, in particular on how averaging theorems must be carefully chosen/applied to this class of problems, where disorder is modeled through a random coefficient in the system of PDEs.

An Abstract Interpolation Lemma and Well-posedness in weighted Sobolev spaces

Wladimir Neves (IM-UFRJ)

Applying an Abstract Interpolation Lemma, we show that the initial value problem for a higher order nonlinear Schrodinger equation, also called Airy-Schrodinger equation, is globally well-posed in weighted Sobolev spaces $X^{2,\mu}$, for $0 \leq \mu \leq 1$. Motivated by the difficult question of how to show the persistence of the solution for dispersive equations in the weighted Sobolev spaces, we proved an Abstract Interpolation Lemma. Then, applying this lemma we were able to show well-posedness for the so called Airy-Schrodinger equation in the weighted Sobolev spaces $X^{s,\mu}$, for $0 \leq \mu \leq 1$ and $s = 2$. Here for simplicity, we have considered $X^{2,\mu}$. We expect that the same technique could be extended without much more effort in two directions, that is, one of them for s larger than 3/2 and less than 2, and in the other direction for $\mu > 1$. Moreover, we are sure that some other weights could be considered, for instance an exponential one. This is joint work with X. Carvajal.

L^p-weighted theory for Navier-Stokes equations in exterior domains
Huy-Hoang Nguyen (IMECC-Unicamp)

This work is devoted to some mathematical questions related to the stationary Navier-Stokes problem in three-dimensional exterior domains. Our approach is based on a combination of properties of Oseen problems in R^3 and in exterior domains of R^3.

Existence and decay of solutions to delayed Navier-Stokes equations in the plane
César Niche (IM-UFRJ)

We prove existence of global (in time and space) solutions to the 2D Navier-Stokes equations, in the case that the external force acting on the fluid has a delay, i.e. depends on the values of the velocity at past times. Provided that the delayed external force satisfies some natural conditions, the L^2 norm of these solutions has algebraic decay. This is joint work with Gabriela Planas (UNICAMP).

Viscous boundary layers for the lake equations with Navier boundary conditions
Dongjuan Niu (CNU Beijing and IMECC-Unicamp)

Motivated by work of Dragos Iftimie and Franck Sueur, we focus on the boundary layer analysis for the viscous lake equations with Navier boundary conditions. We assume that the bottom topography function b=b(x) is non-degenerate. We use matched asymptotics and multiple scale expansion to deduce the boundary layer equation. Energy estimates and the splitting method allow us to give a rigorous proof of existence of the boundary layer solution. Finally, we give rigorous estimates in L^∞ (0,T;L^2) for the error term in the viscous approximation.

Global solutions for the Navier-Stokes equations with some large initial data
Marius Paicu (Université d'Orsay)

We consider the three dimensional Navier-Stokes equations with a large initial data and we prove the existence of a global smooth solution. The main feature of the initial data is that it varies slowly in the vertical direction and has a norm which blows up as the small parameter goes to zero. Using the language of geometrical optics, this type of initial data can be seen as the ``ill prepared" case. Using analytical-type estimates and the special structure of the nonlinear term of the equation we obtain the existence of a global smooth solution generated by this large initial data. This talk is based on a work in collaboration with J.-Y. Chemin and I. Gallagher and on a joint work with Z. Zhang.

Hydrodynamic interaction between rigid bodies

Clodoaldo Ragazzo (IME-USP)

This talk begins with an overview on the physical origin of forces and torques acting on rigid bodies moving in an incompressible fluid. Then the speaker will report on his work on the problem of hydrodynamic interaction of rigid bodies, namely, the forces that two moving rigid bodies cause on each other due to the presence of the surrounding fluid.

Navier-Stokes equations, turbulence and statistical solutions

Ricardo Rosa (IM-UFRJ)

Turbulent flows appear in many different phenomena. From the blood that flows in our veins and arteries to the motion of air within our lungs and around us. From the flow of water in creeks to the atmospheric and oceanic currents. In the flow of gas, oil, and water, from the prospecting end to the entrails of the cities. It is of fundamental importance in science and technology. Great part of the classical theory of turbulence, however, is based on heuristic arguments and empirical information. The statistical theory of turbulence aims towards a rigorous foundation for the classical theory. In this talk, we motivate the definition of statistical solution for treating turbulent flows, illustrate some applications of the theory describing a few rigorous results obtained recently, and mention some delicate abstract problems connected with theory.

Smoothness of the motion of a rigid body immersed in an incompressible perfect fluid

Franck Sueur (Université de Paris VI)

We study the smoothness of the motion of a rigid body immersed in an incompressible perfect fluid which occupies a three-dimensional bounded domain. This is a joint work with Olivier Glass and Takéo Takahashi.

Higher derivatives estimate for the 3D Navier-Stokes equation

Alexis Vasseur (University of Texas at Austin)

A non linear family of spaces, based on the energy dissipation, is introduced. This family bridges an energy space (containing weak solutions to Navier-Stokes equation) to a critical space (invariant through the canonical scaling of the Navier-Stokes equation). This family is used to get uniform estimates on higher derivatives to solutions to the 3D Navier-Stokes equations. Those estimates are uniform, up to the possible blowing-up time. The proof uses blow-up techniques. It is based on a local parabolic regularization result obtained via De Giorgi techniques.

2nd Franco-Brazilian Fluids Summer School

July 15-24, 2010

Program

	Thu 15	Fri 16	Sat 17	Sun 18	Mon 19	Tue 20	Wed 21	Thu 22	Fri 23	Sat 24
9:30-10:30	O. Glass	E. Miot	Free		C. Lacave	D. Ambrose	G. Raugel	M. Rodrigues	F. Ramos	M. Schonbek
10:30-11:00	Coffee	Coffee			Coffee	Coffee	Coffee	Coffee	Coffee	Coffee
11:00-12:30	D. Bresch	M. Paicu			D. Bresch	M. Paicu	H. Nussenzveig Lopes	H. Nussenzveig Lopes	A. Shirikyan	A. Shirikyan
12:30-14:30	Lunch	Lunch			Lunch	Lunch	Lunch	Lunch	Lunch	
14:30-16:00	A. Bronzi X. Huang S. Ibrahim	D. Bresch			M. Paicu	H. Nussenzveig Lopes	M. Souza C. Audiard H. Ali	A. Shirikyan	D. Chamorro S. Ciuperca V.-S. Ngo	
16:00-16:30	Coffee	Coffee			Coffee	Coffee	Coffee	Coffee	Coffee	
16:30-17:30	A. Mikelic	C. Cheverry			M. Lopes	M. Lesieur		D. Crowdy	G. Planas	
20:00							Conference Dinner			

Room Fokko du Cloux (1st floor) in the morning and lecture hall Jordan (ground floor) in the afternoon.

Minicourses

Global weak solutions: From incompressible to compressible flows
Didier Bresch (CNRS et Université de Chambéry)

During these lectures, we will discuss the ideas used to prove global existence of weak solutions ”à la Leray” starting from the standard homogeneous incompressible Navier-Stokes equations and finishing with the compressible Navier-Stokes equations with heat conductivity. The main idea is to allow to understand at each level the difficulties and the main tools.

On the vortex sheet problem for 2D incompressible fluid flow
Helena Nussenzveig Lopes (University of Campinas)

Vortex sheets are an idealized model for flows with strong shears concentrated in a thin region, such as what occurs in the flow trailing an airfoil. In these lectures we will discuss two different approaches to the problem of modeling vortex sheet evolution: the so-called explicit approach, leading to the Birkhoff-Rott equations and the implicit approach, involving weak solutions with vorticity being a measure. We will make a tour of the progress achieved over the past 30 years, including recent results comparing these two approaches.

Global wellposedness of some problems in fluid mechanics
Marius Paicu (Université Paris-Sud)

We review some classical results on the wellposedness theory for the Navier-Stokes equations and we present some new results and methods in this field. We also discuss the global existence of solutions for some related models as the Boussinesq system (which describes the heat convection in an incompressible fluid) and the system of nematic liquid crystals.

Ergodic theory of random dynamical systems and application to stochastic Navier-Stokes equations
Armen Shirikyan (Université de Cergy-Pontoise)

The aim of this short course is to give a quick introduction to the ergodic theory of randomly perturbed dynamical systems and to show how to apply it to some problems arising in mathematical fluid dynamics. We begin with a general study of a class of Markov random dynamical systems (RDS) in a phase space X. It will be shown, in particular, that such an RDS defines a semigroup in the space of probability measures on X. We then introduce the concept of a stationary distribution and describe the Bogolyubov-Krylov argument for its construction. The core of the course is a result on uniqueness and mixing properties of stationary distribution. Its proof if based on a coupling argument which enables one to show that the above-mentioned semigroup is a contraction in the space of measures endowed with the Kantorovich-Wassertein metric. In conclusion, we prove that the results obtained for Markov RDS apply to 2D Navier-Stokes equations perturbed by an external random force.

Invited talks

Some Existence Problems in Interfacial Fluid Dynamics
David Ambrose (Drexel University)

For many problems in interfacial fluid dynamics, such as the water wave or the vortex sheet with surface tension, existence of solutions for initial value problems and existence of traveling solutions has been established in recent years. In this talk, we will look at some other existence problems. First, we will explore the question of existence of weak solutions for interfacial Navier-Stokes flows, in the presence of surface tension. One significant challenge in this problem is finding a weak formulation of the surface tension force, which is supported only at the interface, and is given in terms of the curvature of the interface. As time allows, we will also discuss existence of time-periodic interfacial flows, as well as solutions to elliptic problems in interfacial fluid dynamics such as the unregularized vortex sheet and Boussinesq equations. This includes joint work with Milton Lopes Filho, Timur Milgrom, Helena Nussenzveig Lopes, Walter Strauss, and Jon Wilkening.

Oscillating solutions with nilpotent Jacobian matrix for three dimensional Burger equations
Christophe Cheverry (Université de Rennes 1)

In this talk, we will explain how to construct large amplitude oscillating waves which are solutions on a non trivial domain of both the three dimensional Burger equations (without source term) and of the incompressible Euler equations (without pressure). The solutions are mainly characterized by the fact that the associated Jacobian matrices are nilpotent of rank two. We will insist on the special geometrical features of the involved phasis and on the turbulent phenomena which can be exhibited through the method.

A new calculus for two dimensional vortex dynamics
Darren Crowdy (Imperial College London)

In classical fluid dynamics, an important problem arising in a variety of applications is to understand how vorticity interacts with solid objects (e.g. aerofoils, obstacles or stirrers). For planar flows, a variety of powerful mathematical results exist (complex variable methods, conformal mapping, Kirchhoff-Routh theory) that have been used to study such problems but the constructions are usually restricted to problems with just one, or perhaps two, objects. Expressed another way, most studies deal only with fluid regions that are simply or doubly connected. There has been a general and longstanding perception that problems involving fluid regions of higher connectivity are too challenging to be tackled analytically.The talk will show that there is a way to formulate the theory so that the relevant fluid dynamical formulae are exactly the same irrespective of the connectivity of the domain. This provides a flexible and unified tool for modelling the fluid dynamical interaction of multiple objects/aerofoils/obstacles/stirrers in ideal flow and their interaction with free vortices.

On the control of the displacement of a fluid zone
Olivier Glass (Université Paris-Dauphine)

We consider the 2 dimensional Euler equation for perfect incompressible fluids in a bounded domain, where we can use a part of the boundary conditions as a control, that is, as a way to influence the system

which we can choose. We consider the problem of moving a given zone of the fluid to another fixed zone, by choosing a relevant control. This is a joint work with T. Horsin.

Two Dimensional Incompressible Flow around Several Obstacles Tending to a Curve
Christophe Lacave (Université Paris 7)

In the Atlantic ocean, the stream waters, when meeting the Brazil coast, create big vortices, which move to the gulf of Mexico. These vortices would be a cause of hurricane apparition which damages USA. A natural question is to know whether the chain of islands in the Caribbean sea could be a wall for these vortices. More precisely, we consider n disjoint obstacles of size ε, uniformly distributed on a "imaginary" open curve Γ. We study the behavior of an ideal incompressible flow around these obstacles, when the size tends to zero and the number of obstacles tends to infinity. The main goal is to determine the limit flow and to compare it with the flow around a curve. Is there a part of the flow which crosses the curve? This is work in collaboration with M.C. Lopes Filho and H.J. Nussenzveig Lopes.

Recent developments in large-eddy simulations of inhomogeneous turbulence
Marcel Lesieur (Institut Polytechnique de Grenoble et Académie des Sciences)

After having discussed the limits of turbulence direct-numerical simulations, one presents large-eddy simulations methods, where small scales of velocity and passive scalars are filtered out and modelled by appropriate eddy coefficients in the evolution of large scales. We show how to visualize vortices thanks to the Q-criterion. We concentrate on models developed originally in Fourier space, and leading in real space to the structure-function based models. We first study the incompressible or weakly-compressible plane channel, and discuss drag reduction by longitudinal riblets. Afterwards, the channel with spanwise rotation is looked at. We show a universality with anticyclonic rotating mixing layers. We consider also mixing in incompressible coaxial jets. Finally we discuss compressible turbulence LES with applications to a subsonic (Mach 0.7) and supersonic (Mach 1.4) round jet.

Incompressible flow around small obstacles
Milton Lopes Filho (University of Campinas)

The purpose of this talk is to briefly survey what is known about the asymptotic behavior of incompressible flow around small obstacles, the techniques of proof that have been used and some of the problems that remain open.

Global-in-time solutions for the isothermal Matovich-Pearson equations
Andro Mikelic (Université Lyon 1)

In this talk we present the mathematical study of the equations of Matovich and Pearson describing the process of glass fiber drawing. These equations may be viewed as a 1D-reduction of the incompressible Navier-Stokes equations including free boundary, valid for the drawing of a long and thin glass fiber. We concentrate on the isothermal case without surface tension. Then the equations of Matovich and Pearson represent a nonlinearly coupled system of an elliptic equation for the axial velocity and a hyperbolic transport equation for the fluid cross-sectional area. We first prove existence of a local solution, and, after constructing appropriate barrier functions, we deduce that the fluid radius is always strictly positive and that the local solution remains in the same regularity class. To the best of our knowledge, this is the first global

existence and uniqueness result for this important system of equations. This is a joint work with Eduard Feireisl (Institute of Mathematics of the Academy of Sciences of the Czech Republic, Prague) and Philippe Laurençot (Institut de Mathématiques de Toulouse).

The Cauchy problem for the 3-D Vlasov-Poisson system with point charges.
Evelyne Miot (Università di Roma La Sapienza)

In this talk, I will consider a modified Vlasov-Poisson system describing the evolution of a three-dimensional bounded distribution of electrical particles, a plasma, interacting with a finite number of charged point particles. I will present a global existence and uniqueness result in the case of repulsive interaction. This is joint work with Carlo Marchioro and Mario Pulvirenti.

Some problems related to irreversible phase change with fluid flow
Gabriela Planas (University of Campinas)

In this talk we present some models for the evolution of the process of irreversible phase change of certain pure materials by taking into account the effects of fluid flow in the molten regions. These models consist of systems of highly non-linear free-boundary equations which include a heat equation, a doubly nonlinear inclusion for the phase change and Navier-Stokes type equations singularly perturbed. This is a joint work with J.L. Boldrini and L.H. de Miranda.

Scaling in turbulent flows: Heuristics and rigorous results
Fabio Ramos (University of Bonn and Universidade Federal do Rio de Janeiro)

In this talk I will present some classical heuristics and related recent rigorous results for the Kolmogorov-Obukhov spectral scaling for fluid flows at high Reynolds number. In particular, I will describe the main ideas introduced in the recent work: "Universal bounds for the Littlewood-Paley first-order moments of the 3D NSE", joint with Felix Otto.

Dynamics of two-dimensional second grade fluids
Geneviève Raugel (CNRS et Université Paris-Sud)

In this talk, we consider the second grade fluid equations in a two-dimensional torus T^2, with initial data in the Hilbert space $H^3(T^2)^2$ and a forcing term in $H^1(T^2)^2$. These equations depend on a positive "material coefficient" α. We quickly show that, if the forcing term belongs to $H^m(T^2)^2$, where $m > 1$, then the compact global attractor A_α in $H^3(T^2)^2$ actually belongs to a more regular space $H^s(T^2)^2$, $s > 3$. If α is sufficiently small, A_α is bounded in $H^{m+2}(T^2)^2$. When α is small, the semiflow $S_\alpha(t)$ generated by the second grade fluid equations can be considered as a non regular perturbation of the semiflow $S_0(t)$ generated by the Navier-Stokes equations. Using the previously mentioned regularity result, we are comparing the dynamics of $S_\alpha(t)$ with the dynamics of $S_0(t)$, when α goes to zero.

Vortex-like finite-energy asymptotic profiles for isentropic compressible flows
Luis Miguel Rodrigues (Université Lyon 1)

Bidimensional incompressible viscous flows with well-localised vorticity are well-known to develop vortex structures. Our purpose is to recover the asymptotic profiles describing these phenomena for homogeneous finite-energy flows as asymptotic profiles for near-equilibrium isentropic compressible flows. This task is performed by extending the sharp description of the asymptotic behaviour of near-equilibrium compressible flows obtained by David Hoff and Kevin Zumbrun to the case of finite-energy vortex-like solutions.

Norm inflation for incompressible magneto-hydrodynamic system

Maria Schonbek (University of Santa Cruz)

Based on the construction of Bourgain and Pavlovic , I will show that the solutions to the Cauchy problem for the three dimensional different types of norm inflations in $B_{\infty}^{-1,\infty}$. Particularly the magnetic field can develop norm inflation in short time even when the velocity remains small and vice verse.

Short talks

Leray alpha model of turbulence in bounded domains
Hani Ali (Université de Rennes 1)

We aim to establish the existence of a unique weak solution to turbulent flows governed by the Leray-alpha model. We consider the Navier's slip boundary conditions for the velocity.

Boundary value problem for the linearized Euler-Korteweg system
Corentin Audiard (Université Lyon 1)

The Euler-Korteweg system consists of the Euler equation with an additional stress term: $\nabla(K(\rho)\Delta\rho + \frac{1}{2}K'(\rho)|\nabla\rho|^2)$ in the momentum equation. This system displays both hyperbolic (Euler part) and dispersive (added stress tensor) properties. The study of the Cauchy problem by S.Benzoni, R.Danchin and S.Descombes, 2007) has made use of an extended Schrödinger-like system. Here we are interested in the boundary value problem for this system in the half line $\{x \geq 0\}$. Our approach for the linearized Euler-Korteweg system consists in adaptating the construction of Kreiss symmetrizers (H.O. Kreiss, 1970), which originally applies to hyperbolic first order operators, to quasi homogeneous operators. Under a generalized (uniform) Kreiss-Lopatinskiĭ condition we obtain well-posedness of the pure boundary value problem, and then for the initial boundary value problem, by using dispersive estimates for the solution of the Cauchy problem.

Existence of weak solutions for the Euler equations with helical symmetry without swirl
Anne Bronzi (University of Campinas)

In a recent work, B. Ettinger and E. Titi proved global existence and uniqueness of weak solutions of the 3D Euler equations with helical symmetry without swirl for bounded domains with initial vorticity in L^∞. In a joint work with Helena Nussenzveig Lopes and Milton Lopes, we improved this result proving global existence in the whole $\mathbb{R}^3$, with initial vorticity in L^p, for $p > 4/3$, and compactly supported in the plane.

Hölder regularity for a fractional diffusion transport equation
Diego Chamorro (Université d'Evry)

In this talk, I will present how to study Hölder regularity for solutions of a transport equation which is motivated by the dissipative quasi-geostrophic equation. Following an idea of A. Kiselev and F. Nazarov, I will use a molecular characterization of local Hardy spaces h^p in order to obtain some information on regularity by following the evolution of molecules. Besov regularity will also be studied using as starting point a maximal-type principle.

Some mathematical aspects in the FENE dumbbell model of polymeric fluids.
Sorin Ciuperca (Université Lyon 1)

We consider the evolution Fokker-Planck-Smoluchowski equation associated to the so called FENE dumbbell model (Finitely Extendible Nonlinear Elasticity) which gives the density distribution of the

molecules of a polymer in a diluted solution of polymeric fluid. We first prove the existence and the uniqueness of a positive stationary solution of this equation and we give the behaviour of the solution near the boundary of its domain of definition. Then we prove the asymptotic stability of this stationary solution.

Serrin Type Criterion for the Three-Dimensional Compressible Flows

Xiangdi Huang (Université de Chambéry)

We extend the well-known Serrin's blowup criterion for the three-dimensional (3D) incompressible Navier-Stokes equations to the 3D compressible Navier-Stokes equations. In other words, in addition to Serrin's condition on the velocity, the $L^1(0,T;L^\infty)$ norm of the divergence of the velocity is also needed to control the possible breakdown of strong (or smooth) solutions for the three-dimensional compressible Navier-Stokes equations. Moreover, under some additional constraint on the viscosity coefficients, either the $L^1(0,T;L^\infty)$ norm of the divergence of the velocity or the upper bound of the density will be enough to guarantee the global existence of classical (or strong) solutions.

Well posedness and unconditional uniqueness for the Cauchy problem of a semilinear heat equation in two space dimension

Slim Ibrahim (Université de Tunis)

We consider the heat equation with exponential type nonlinearity in two space dimension. If the Cauchy data are in the Sobolev space H^1, then we show the wellposedness. However, if we slightly enlarge it a little bit (by taking the initial data in Orlicz space), we show the non-uniqueness of solutions, and thus the Cauchy problem is illposed. At the end of the talk, I will discuss the possible extendibility of such result for dispersive equations. This work is joint with R. Jrad, M. Majdoub and T. Saanouni.

Global existence results for fast rotating anisotropic fluids with vanishing viscosity

Van-Sang Ngo (Université Paris-Est Créteil)

In this talk, we consider fast rotating fluids with vanishing anisotropic viscosity in $\mathbb{R}^3$. This model can be used to describe the behaviors of oceanic currents with good accuracy. We prove the global existence of a unique strong solution for large initial data when the rotation is fast enough, in different cases where the initial data are well prepared (of finite energy in $\mathbb{R}^3$) or ill prepared (sum of a "two-dimensional part" and a "three-dimensional part").

Epidemiological Models from a PDE point of view

Max Souza (Universidade Federal Fluminense)

We present a derivation of the SIR epidemiological model as a PDE system, and how it can be studied as a transport problem. Relation with discrete versions of the model, and with probabilistic interpretations of the PDE solution will also be presented. This is joint work with F.A.C.C. Chalub.

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Nous avons bénéficié du soutien du programme ARCUS pour deux écoles d'été.

I. Ecole d'été de Campinas, 13-22 janvier 2010.

Page web : http://www.ime.unicamp.br/~fluid/veraofluid/

Le financement ARCUS utilisé pour cet atelier a été de 6500 Euros (7000 accordés initialement dont 500 n'ont pas été utilisés et ont été reportés sur l'atelier de Lyon). Ont été financés les participants de la région Rhône-Alpes suivants :

- Corentin AUDIARD (Doctorant Lyon) : 1580 (avion + séjour)
- Mathieu BONNIVARD (Doctorant Chambéry) : 1527 (avion + séjour)
- Lorenzo BRANDOLESE (MCF Lyon) : 865 Euros (billet d'avion). Les frais de séjour ont été pris en charge par les organisateurs.
- Roula FARES (Doctorante Saint-Etienne) : 1527 (avion + séjour)
- Thierry GALLAY (PR Grenoble) : 1000 Euros (billet d'avion). Les frais de séjour ont été pris en charge par les organisateurs.

Les autres sources de financement dont les organisateurs ont disposé sont les suivantes :

- FAPESP : 13385 Euros (34000 R$)
- CNPq : 3350 Euros (8500 R$)
- Coopération CNRS-FAPESP : environ 6000 Euros

Budget global : 29235 Euros.

Part ARCUS : 22%

II. Ecole d'été de Lyon, 15-24 juillet 2010.

Page web : http://math.univ-lyon1.fr/~iftimie/ECOLEFLUIDES/

Le financement ARCUS utilisé pour cet atelier a été de 9500 Euros (7000 accordés initialement + supplément de 2000 Euros + 500 Euros report de l'atelier précédent). Ont été financés les participants brésiliens suivants :

- Anne BRONZI (Doctorante Campinas) : 328 Euros (hôtel + déjeuners + dîner conférence)
- Milton LOPES FILHO (Professeur Campinas) : 108 Euros (déjeuners + dîner conférence)
- Cecilia MONDAINI (Doctorante Rio de Janeiro) : 1730 Euros (avion + séjour)
- Helena NUSSENZVEIG LOPES (Professeur Campinas) : 108 Euros (déjeuners + dîner conférence)
- Eleonora PINTO DE MOURA (Postdoc Campinas) : 328 Euros (hôtel + déjeuners + dîner

conférence)

- Gabriela PLANAS (Enseignante-chercheuse Campinas) : 108 Euros (déjeuners + dîner conférence)
- Adilson PRESOTO (Doctorant Louvain-la-Neuve et Campinas) : 638 Euros (voyage + séjour)
- Fabio RAMOS (Enseignant-chercheur Rio de Janeiro) :1808 Euros (avion + séjour)
- Max SOUZA (Enseignant-chercheur Rio de Janeiro) : 2038 Euros (avion + séjour)
- Luiz Alberto VIANA (Doctorant Campinas) : 1753 Euros (avion + séjour)
- Humberto VIGLIONI (Doctorant São Paulo) : 2018 Euros (avion + séjour)

NB : Le budget ARCUS alloué a été dépassée, les autres sources de financement étant mise à contribution pour financer les participants brésiliens.

Les autres sources de financement dont les organisateurs ont disposé sont les suivantes :

- CNRS via financements écoles thématiques : 11000 Euros
- Coopération CNRS-FAPESP : environ 6000 Euros
- Institut Camille Jordan : 3600 Euros
- CS de l'Université Lyon 1 : 1000 Euros
- GDR EDP : 1000 Euros

Budget global : 32100 Euros

Part ARCUS : 30%

ANNEXE 3

Table des maières: 1. Rapport des organisateurs français. 2. Programme. 3. Liste des participants. 4. Rapport des organisateurs brésiliens (avec liste des participants incluant le niveau d'étude). 5. Analyses statistiques de la provenance des participants.

Rapport sur l'école « Brazil-France School and Workshop on Algebraic Geometry » IMPA, Rio de Janeiro 18-29 octobre 2010

http://www.impa.br/opencms/pt/eventos/store_old/evento_1010

Cette école s'est déroulée au cours de la seconde quinzaine du mois d'octobre 2010. Son thème général était celui de la géométrie algébrique, un thème à la fois bien établi et connaissant sans cesse de multiples mutations. Il s'est souvent décliné, à travers les cours et les exposés de recherche, sous forme d'interventions en rapport avec la théorie des nombres, la théorie des groupes, la géométrie analytique…

L'IMPA est un centre de niveau international ; sa réputation d'excellence n'est plus à faire. Cette réputation s'est construite sur des thèmes bien identifiables, notamment les systèmes dynamiques sous diverses formes. Le choix thématique pour cette école a été guidé en particulier pour aider le développement en cours d'autres thèmes dans cette institution ; la géométrie algébrique en est un très bon exemple.

Dès le départ, cette école a été conçue pour mêler intimement les activités de recherche et les activités pédagogiques. Ce choix s'est imposé naturellement, car le niveau choisi pour les cours a été celui de cours doctoraux, c'est-à-dire de niveau plus élevé que celui d'un cours de master 2 (typiquement, les cours doctoraux sont organisés en France par les écoles doctorales des universités pour consolider la formation des doctorants et élargir le spectre mathématique des collègues permanents déjà en place). Ce choix de mêler recherche et enseignement s'est traduit notamment par l'emploi du temps (ci-joint) selon lequel les quatre premiers jours de chaque semaine étaient consacrés à des cours doctoraux et le dernier jour à des exposés de recherche. Une des journées de recherche s'est déroulée à l'UFF de Niteroi de façon à contribuer à la mobilité des chercheurs dans la zone de Rio.

Le **comité scientifique** et organisateur était le suivant :

Carolina Araujo (IMPA, Brazil)
Eduardo Esteves (IMPA, Brazil)
Nivaldo Medeiros (UFF, Brazil)
Marco Pacini (UFF, Brazil)
Emmanuel Peyre (UJF, Grenoble, France)
Bertrand Rémy (UCBL, Lyon, France)

L'**audience** (66 personnes) s'est répartie comme suit :

Auditeurs de l'IMPA : 19
Auditeurs de Rio hors IMPA : 22
Auditeurs du Brésil hors Rio : 15
Auditeurs étrangers : 10

Les sources de **financement** ont été les suivantes :

Contribution IMPA : 13.350,00 reais = 5.961,65 euros

Contribution CAPES: 7.480,00 reais = 3.343,29 euros
Sous-total brésilien : 20.830,00 reais = 9.310,25 euros

Contribution ARCUS : 12000 euros
Contribution IUF (Bertrand Rémy) : 600 euros
Sous-total français : 12600 euros

Brazil-France School and Workshop on Algebraic Geometry

IMPA, Rio de Janeiro, from 10/18 to 10/29.

Program - First Week

IMPA

Hour	Monday 18	Tuesday 19	Wednesday 20	Thursday 21
08:30 - 08:50	Registration & Check in			
09:00 - 10:30	08:50 - Opening **COURSE 1:** Introduction to algebraic groups - Bertrand Rémy	**COURSE 1:** Introduction to algebraic groups - Bertrand Rémy	**COURSE 1:** Introduction to algebraic groups - Bertrand Rémy	**COURSE 1:** Introduction to algebraic groups - Bertrand Rémy
10:30 - 11:00	Coffee Break			
11:00 - 12:30	**COURSE 2:** Frobenius splitting - Stéphane Druel	**COURSE 2:** Frobenius splitting - Stéphane Druel	**COURSE 2:** Frobenius splitting - Stéphane Druel	**COURSE 2:** Frobenius splitting - Stéphane Druel
12:30 - 14:00	Lunch			
14:00 - 16:00			COMMUNICATIONS	Free Afternoon
16:00-18:00	**COURSE 3:** Rational curves on algebraic varieties - Carolina Araujo	**COURSE 3:** Rational curves on algebraic varieties - Carolina Araujo	**COURSE 3:** Rational curves on algebraic varieties - Carolina Araujo	

UFF

Hour	Friday 22
09:00 - 10:00	**Emmanuel Peyre (Université Joseph Fourier)** Complexity
10:00 - 11:00	**Amílcar Pacheco (UFRJ)** Rational points of abelian varieties in pro-p towers of function fields
11:00 - 11:30	Coffee Break
11:30 - 12:30	**Amaury Thuillier (Lyon)** The homotopy type of a resolution of singularities
12:30 - 14:30	Lunch
14:30 - 15:30	**Abramo Hefez (UFF)** TBA
15:30 - 16:30	**Stéphane Druel (Université Joseph Fourier)** Reductions of irreducible symplectic varieties defined over number fields
16:30 - 17:00	Coffee Break
17:00 - 18:00	**Aron Simis (UFPE)** Monomial Cremona maps and their combinatorics

IMPA

Hour	Monday 25	Tuesday 26	Wednesday 27	Thursday 28
09:00 - 10:30	**COURSE 4:** Introduction to Berkovich geometry - Amaury Thuillier	**COURSE 4:** Introduction to Berkovich geometry - Amaury Thuillier	**COURSE 4:** Introduction to Berkovich geometry - Amaury Thuillier	**COURSE 4:** Introduction to Berkovich geometry - Amaury Thuillier
10:30 - 11:00	**Coffee Break**			
11:00 - 12:30	**COURSE 5:** Rational points and rational curves - Emmanuel Peyre	**COURSE 5:** Rational points and rational curves - Emmanuel Peyre	**COURSE 5:** Rational points and rational curves - Emmanuel Peyre	**COURSE 5:** Rational points and rational curves - Emmanuel Peyre
12:30 - 14:00	**Lunch**			
14:00 - 16:00			**COMMUNICATIONS**	Free Afternoon
15:00 - 16:00				
16:00-18:00	**COURSE 6:** Geometric Invariant Theory - Eduardo Esteves	**COURSE 6:** Geometric Invariant Theory - Eduardo Esteves	**COURSE 6:** Geometric Invariant Theory - Eduardo Esteves	

IMPA

Hour	Friday 29
9:30 - 10:30	**Mihai Paun (Video) (Nancy Université - Institut Elie Cartan)** Bergman kernels and applications
10:30 - 11:00	**Coffee Break**
11:00 - 12:00	**Jean-Yves Welschinger (Video) (École Normale Superieure de Lyon)** Exponential rarefaction of real curves with many components
12:00 - 14:00	**Lunch**
14:00 - 15:00	**Bertrand Rémy (Université Claude Bernard Lyon 1)** Berkovich geometry and Satake compactifications
15:00 - 16:00	**Rodolphe Richard** Counting, Tightness and (non arch.) Symmetric spaces
16:00 - 16:30	**Coffee Break**
16:30 - 17:30	**Arnaldo Garcia (IMPA)** On recursive towers of curves over finite fields

http://www.impa.br/opencms/pt/eventos/store_old/evento_1010

Abdelmoubine Amar Henni, IMECC
Abramo Hefez, Universidade Federal Fluminense
Acir Carlos da Silva Junior, Instituto de Matematica Pura e Aplicada
Alan Gerardo Reyes Figueroa, Instituto de Matematica Pura e Aplicada
Alejandro Simarra Cañate, Instituto de Matematica Pura e Aplicada
Alex Correa Abreu, Universidade Federal Fluminense
Alexander Holguín Villa, Instituto de Matemática e Estatística
Alma Maria Armijo Averill, Universidade Federal do Rio de Janeiro
Altemar Brito Lima, Instituto de Matematica Pura e Aplicada
Amaury Thuillier, Université Claude Bernard Lyon 1
Amilcar Pacheco, Universidade Federal do Rio de Janeiro
Ana Cláudia da Silva Moreira, Universidade Federal de Itajubá
André Luís Contiero, Universidade Federal de Alagoas
Andrea Luiza Gonçalves Martinho, Universidade Federal do Rio de Janeiro
Antonio Nigro, Politecnico di Torino
Arnaldo Leite Pinto Garcia, Instituto de Matematica Pura e Aplicada
Aron Simis, Universidade Federal de Pernambuco
Arturo Ulises Fernandez Perez, Instituto de Matematica Pura e Aplicada
Bertrand Rémy, Université Claude Bernard Lyon 1
Camilo David Moreira Dorado, Universidade Federal Fluminense
Carlos Nemer, Instituto Politécnico do Rio de Janeiro
Carlos Suarez, Universidad Central del Ecuador
Carolina Bhering de Araujo, Instituto de Matematica Pura e Aplicada
Claudio Plinio Campana Chacca, Universidade Federal Fluminense
Clayton de Lima, Universidade Federal Rural do Rio de Janeiro
Cristina Beatriz Manzaneda Herrera, Universidade Catolica do Norte - Antofagasta
Daniel Carlos Leite, Universidade Federal de Minas Gerais
Daniel Levcovitz, USP - Instituto de Ciências Matemáticas e Computação São Carlos
Daniela Moura Prata dos Santos, IMECC
Douglas Monsôres de Melo Santos, Instituto de Matematica Pura e Aplicada
Edilaine Ervilha Nobili, Instituto de Matematica Pura e Aplicada
Eduardo Esteves, Instituto de Matematica Pura e Aplicada
Emmanuel Peyre, Université Joseph Fourier
Fábio Xavier Penna, Instituto de Matematica Pura e Aplicada
Flávio de Matos Silva, Instituto Politécnico do Rio de Janeiro
Flavio Ferreira da Rocha, Instituto de Matematica Pura e Aplicada
Frederico Nizzato da Silva Oliveira, Universidade Federal de Minas Gerais
Frederico Sercio Feitosa, Universidade Federal de Juiz de Fora
Gabriel Araujo Guedes, Universidade Federal de Pernambuco
Gerandy, Instituto de Matematica Pura e Aplicada
Giuseppe Borrelli, Universidade Federal Fluminense
Herman Serrano, Universidad Tecnológica de Pereira
Hernan Maycol Falla Luza, Universidade Federal Fluminense
Hernando Bedoya, Universidade do Estado do Rio de Janeiro
Hugo Leonardo de Andrade Guimarães, Universidade Federal de Pernambuco
Israel Vainsencher, Universidade Federal de Minas Gerais
Jayron Soares, Escola Nacional de Ciências Estatísticas

Jefferson Ribeiro Nogueira, Universidade Federal Fluminense
Jocer Franquiz, Universidade Central de Venezuela
Jorge Gonzales, Observatório Nacional
José Gregorio Gómez García, Universidade Central de Venezuela
Juliana Coelho Chaves, Universidade Federal Fluminense
Leandro Aguiar Fernandes, Instituto Politécnico do Rio de Janeiro
Leandro Tomaz de Araujo, Universidade Federal Rural do Rio de Janeiro
Liliana Puchuri Medina, Instituto de Matematica Pura e Aplicada
Luca Belli, Instituto de Matematica Pura e Aplicada
Luciana Silva Salgado, Universidade Federal do Rio de Janeiro
Marco Pacini, Universidade Federal Fluminense
Martin de Borbon, Instituto de Matematica Pura e Aplicada
Martin Peters, Springer Verlag
Masoud Ataei, Institute for Advanced Studies In Basic Sciences
Mauro Fernando Hernández Iglesias, Universidade Federal Fluminense
Melina Privitelli, Consejo Nacional de Investigaciones Cientificas y Tecnicas
Michal Lason, Institute of Mathematics, Polish Academy of Sciences
Michelle Morgado, USP - Instituto de Ciências Matemáticas e Computação São Carlos
Mihai Paun, Nancy Université - Institut Elie Cartan
Mohammad Reza Rahmati, Institute for Studies In Theoretical Physics and Mathematics
Napoleón Caro Tuesta, USP - Instituto de Ciências Matemáticas e Computação São Carlos
Nicolas Puignau, Universidade do Estado do Rio de Janeiro
Nivaldo Medeiros, Universidade Federal Fluminense
Parham Salehyan, Universidade Estadual Paulista - São José do Rio Preto
Patrícia Borges dos Santos, IMECC
Pedro Hernandez Rizzo, Instituto de Matematica Pura e Aplicada
Rafael Lucas de Arruda, Universidade Estadual Paulista - São José do Rio Preto
Raquel Tavares Scarpelli de Araujo Moreira, Universidade Federal do Estado do Rio de Janeiro
Roberto Callejas Bedregal, Universidade Federal da Paraiba - João Pessoa
Rodolphe Richard, École Polytechnique
Rodrigo Salomão, Universidade Federal Fluminense
Saulo José de Melo Cunha, Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Sergio Licanic, Universidade Federal Fluminense
Silmara Juliana de Oliveira Ramos, Universidade Federal de Santa Catarina
Stéphane Druel, Université Joseph Fourier
Stephanie Daniela Pumarino Canete, Universidade Federal da Bahia
Thiago Fassarella do Amaral, Universidade Federal Fluminense
Viviana Ferrer Cuadrado, Instituto de Matematica Pura e Aplicada
Wanderson Costa e Silva, Instituto de Matematica Pura e Aplicada
Welschinger, Jean-Yves, École Normale Superieure de Lyon
Willian Douglas Santos Porto, Universidade Federal dos Vales do Jequitinhonha e Mucuri
Wilson Albeiro Cuellar Carrera, Instituto de Matemática e Estatística
Yves Lequain, Instituto de Matematica Pura e Aplicada

Brazil-France School and Workshop on Algebraic Geometry
IMPA, Rio de Janeiro, de 18/10 até 29/10.

Relatório de Atividades

O Encontro "Brazil-France School and Workshop on Algebraic Geometry" realizou-se no IMPA e na UFF, de 18 a 29 de outubro, e consistiu de 6 mini-cursos, 11 palestras plenárias e 4 comunicações. Foi um evento direcionado a estudantes de doutorado e jovens pesquisadores em Geometria Algébrica e áreas afins. O objetivo da escola-workshop foi possibilitar aos participantes expandirem seus conhecimentos e horizontes de pesquisa e desenvolverem novas conexões científicas, estimulando futuras colaborações entre geômetras algébricos do Brasil e da França.

Nos últimos anos houve um crescimento quantitativo e qualitativo na produção científica em Geometria Algébrica no Brasil, bem como no número de estudantes de mestrado e doutorado trabalhando nesta área de pesquisa. Uma massa crítica crescente de jovens fez importante e necessária a realização de encontros científicos voltados especificamente para estudantes de doutorado e recém-doutores em Geometria Algébrica. Neste contexto, professores da UFMG e UFSJ organizaram dois encontros de Teoria de Interseção para alunos de doutorado, em 2006 e 2009; e professores da UFF promoveram em janeiro de 2010 o LEGAL (Liberdade em Geometria Algébrica), evento que teve grande sucesso ao congregar e estimular cientificamente dezenas de doutorandos e recém-doutores em Geometria Algébrica, não só brasileiros como também estrangeiros, sobretudo latino-americanos. Atividades nestes moldes têm tido uma importância fundamental para a formação, consolidação, integração e ampliação com qualidade de um grupo nacional expressivo em Geometria Algébrica. O encontro em organização, o "Brazil-France School and Workshop on Algebraic Geometry", se insere neste contexto.

Os principais temas abordados foram

- Grupos Algébricos
- Teoria Geométrica dos Invariantes
- Curvas racionais em variedades
- Pontos racionais de variedades
- Geometria de Berkovich

Seu Comitê Científico e Organizador foi formado por:

- Carolina Araujo (IMPA, Brazil)
- Eduardo Esteves (IMPA, Brazil)
- Nivaldo Medeiros (UFF, Brazil)

- Marco Pacini (UFF, Brazil)
- Emmanuel Peyre (UJF, Grenoble, France)
- Bertrand Rémy (UCBL, Lyon, France)

Para sua realização e sucesso contamos com o apoio das seguintes instituições, sempre nossas parceiras e que permitem a realização e divulgação de pesquisa brasileira:

- CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior;
- IMPA – Instituto de Matemática Pura e Aplicada;
- INCTMat - Instituto Nacional de Ciência e Tecnologia da Matemática e
- Academia Brasileira de Ciências.

Uma síntese do Workshop, assim como a lista de palestrantes e o programa, encontra-se no sítio http://www.impa.br/opencms/pt/eventos/store_old/evento_1010

A seguir, descrevemos as atividades científicas ocorridas ao longo das duas semanas do evento: os mini-cursos, cada um com duração de 6 horas; as palestras plenárias, com duração de 1 hora; e as comunicações, de 30 minutos.

Mini-cursos:

Carolina Araujo (IMPA)
Rational curves on algebraic varieties

Stéphane Druel (Grenoble)
Frobenius splitting

Eduardo Esteves (IMPA)
Geometric Invariant Theory

Emmanuel Peyre (Grenoble)
Rational points and rational curves

Bertrand Rémy (Lyon)
Introduction to algebraic groups

Amaury Thuillier (Lyon)
Introduction to Berkovich geometry

Palestras Plenárias:

Stéphane Druel (Université Joseph Fourier, França)
Reductions of irreducible symplectic varieties defined over number fields

Arnaldo Garcia (IMPA, Brasil)
On recursive towers of curves over finite fields

Abramo Hefez (UFF, Brasil)
Toward the complete solution of analytic classification of plane curve singularities

Emmanuel Peyre (UJF, Grenoble, França)
Complexity

Amílcar Pacheco (UFRJ, Brasil)
Rational points of abelian varieties in pro-p towers of function fields

Mihai Paun (Nancy Université - Institut Elie Cartan, França)
Bergman kernels and applications

Bertrand Rémy (Université Claude Bernard Lyon 1, França)
Berkovich geometry and Satake compactifications

Rodolphe Richard (École Polytechnique, França)
Counting, Tightness and (non arch.) Symmetric spaces

Aron Simis (UFPe, Brasil)
Monomial Cremona maps and their combinatorics

Amaury Thuillier (Lyon, França)
The homotopy type of a resolution of singularities

Jean-Yves Welschinger (École Normale Superieure de Lyon, França)
Exponential rarefaction of real curves with many components

<u>Comunicações:</u>

Roberto Callejas Bedregal (UFPb)
Lê cycles and Milnor classes

Juliana Coelho (UFF)
Abel maps and Brill-Noether varieties

Daniel Levcovitz (USP - Instituto de Ciências Matemáticas e Computação São Carlos)
Enumeration of involutive curve in $P3$

Parham Salehyan (UNESP - São José do Rio Preto)
Some remarks on Weierstrass points

O evento contou com a presença de 66 participantes, dos quais 56 do Brasil e 10 do exterior. A lista de participantes é apresentada abaixo:

Participantes

Nome	Instituição Atual	Grau
Abdelmoubine Amar Henni	IMECC (UNICAMP)	Doutor
Abramo Hefez	Universidade Federal Fluminense (UFF)	Doutor
Acir Carlos da Silva Junior	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Alan Gerardo Reyes Figueroa	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Alejandro Simarra Cañate	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Alex Correa Abreu	Universidade Federal Fluminense (UFF)	Doutor
Alma Maria Armijo Averill	Universidade Federal do Rio de Janeiro (UFRJ)	Estudante de Mestrado
Amaury Thuillier	Université Claude Bernard Lyon 1 (UCBL)	Doutor
Amilcar Pacheco	Universidade Federal do Rio de Janeiro (UFRJ)	Doutor
Antonio Nigro	Politecnico di Torino (POLITO)	Doutor
Arnaldo Leite Pinto Garcia	Instituto de Matematica Pura e Aplicada (IMPA)	Doutor
Aron Simis	Universidade Federal de Pernambuco (UFPE)	Doutor
Arturo Ulises Fernandez Perez	Instituto de Matematica Pura e Aplicada (IMPA)	Doutor
Bertrand Rémy	Université Claude Bernard Lyon 1 (UCBL)	Doutor
Camilo David Moreira Dorado	Universidade Federal Fluminense (UFF)	Estudante de Doutorado
Carolina Bhering de Araujo	Instituto de Matematica Pura e Aplicada (IMPA)	Doutor
Claudio Plinio Campana Chacca	Universidade Federal Fluminense (UFF)	Mestre
Clayton de Lima	Universidade Federal Rural do Rio de Janeiro (UFRRJ)	Estudante Universitário
Cristina Beatriz Manzaneda Herrera	Universidade Catolica do Norte - Antofagasta	Mestre
Daniel Carlos Leite	Universidade Federal de Minas Gerais (UFMG)	Estudante de Doutorado
Daniel Levcovitz	USP - Instituto de Ciências Matemáticas e Computação São Carlos (ICMCSC)	Doutor
Daniela Moura Prata dos Santos	IMECC (UNICAMP)	Mestre
Douglas Monsôres de Melo Santos	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Edilaine Ervilha Nobili	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Eduardo Esteves	Instituto de Matematica Pura e Aplicada (IMPA)	Doutor
Emmanuel Peyre	Université Joseph Fourier (UJF)	Doutor
Fábio Xavier Penna	Instituto de Matematica Pura e Aplicada (IMPA)	Mestre
Flávio de Matos Silva	Instituto Politécnico do Rio de Janeiro (UERJ - IPRJ)	Estudante de Mestrado
Flavio Ferreira da Rocha	Instituto de Matematica Pura e Aplicada (IMPA)	Mestre

Frederico Nizzato da Silva Oliveira	Universidade Federal de Minas Gerais (UFMG)	Estudante Universitário
Frederico Sercio Feitosa	Universidade Federal de Juiz de Fora (UFJF)	Mestre
Gabriel Araujo Guedes	Universidade Federal de Pernambuco (UFPE)	Estudante de Doutorado
Gerandy	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Mestrado
Giuseppe Borrelli	Universidade Federal Fluminense (UFF)	Doutor
Herman Serrano	Universidad Tecnológica de Pereira (UTP)	Doutor
Hernan Maycol Falla Luza	Universidade Federal Fluminense (UFF)	Doutor
Hernando Bedoya	Universidade do Estado do Rio de Janeiro (UERJ)	Doutor
Juliana Coelho Chaves	Universidade Federal Fluminense (UFF)	Doutor
Leandro Aguiar Fernandes	Instituto Politécnico do Rio de Janeiro (UERJ - IPRJ)	Estudante de Mestrado
Liliana Puchuri Medina	Instituto de Matematica Pura e Aplicada (IMPA)	Doutor
Luca Belli	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Luciana Silva Salgado	Universidade Federal do Rio de Janeiro (IM/UFRJ)	Estudante de Doutorado
Marco Pacini	Universidade Federal Fluminense (UFF)	Doutor
Martin de Borbon	Instituto de Matematica Pura e Aplicada (IMPA)	Universitário Completo
Mauro Fernando Hernández Iglesias	Universidade Federal Fluminense (UFF)	Mestre
Michelle Morgado	USP - Instituto de Ciências Matemáticas e Computação São Carlos (ICMCSC)	Doutor
Mihai Paun	Nancy Université - Institut Elie Cartan (IECN)	Doutor
Napoleón Caro Tuesta	USP - Instituto de Ciências Matemáticas e Computação São Carlos (ICMCSC)	Estudante de Doutorado
Nicolas Puignau	Universidade do Estado do Rio de Janeiro (UERJ)	Doutor
Nivaldo Medeiros	Universidade Federal Fluminense (UFF)	Doutor
Parham Salehyan	Universidade Estadual Paulista - São José do Rio Preto (UNESP)	Doutor
Patrícia Borges dos Santos	IMECC (UNICAMP)	Estudante de Doutorado
Pedro Hernandez Rizzo	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Rafael Lucas de Arruda	Universidade Estadual Paulista - São José do Rio Preto (UNESP)	Estudante de Mestrado
Raquel Tavares Scarpelli de Araujo Moreira	Universidade Federal do Estado do Rio de Janeiro (UNIRIO)	Mestre
Roberto Callejas Bedregal	Universidade Federal da Paraiba - João Pessoa (UFPB)	Doutor
Rodolphe Richard	École Polytechnique (EP)	Doutor
Rodrigo Salomão	Universidade Federal Fluminense (UFF)	Doutor
Sergio Licanic	Universidade Federal Fluminense (UFF)	Doutor

Silmara Juliana de Oliveira Ramos	Universidade Federal de Santa Catarina (UFSC)	Estudante Universitário
Stéphane Druel	Université Joseph Fourier (UJF)	Doutor
Thiago Fassarella do Amaral	Universidade Federal Fluminense (UFF)	Doutor
Viviana Ferrer Cuadrado	Instituto de Matematica Pura e Aplicada (IMPA)	Doutor
Wanderson Costa e Silva	Instituto de Matematica Pura e Aplicada (IMPA)	Estudante de Doutorado
Welschinger, Jean-Yves	École Normale Superieure de Lyon (ENS-LYON)	Doutor
Yves Lequain	Instituto de Matematica Pura e Aplicada (IMPA)	Doutor

Quadro justificativo do público alvo do evento

P Ú B L I C O	E s p e r a d o	E f e t i v a d o
Professores/Pesquisadores Doutores	30	35
Professores (Mestres e Mestrandos)	15	8
Alunos de Pós-Graduação -Doutorando	15	14
Alunos de Graduação		3
Profissionais		
Estudante de Mestrado		6
Total	60	66

Material de divulgação do evento em anexo:

1 crachá
1 bloco de rascunho (amostra)
1 programa (amostra de livreto)
1 relatório científico completo
1 mochila

REPORT FOR THE FRENCH PART

FROM RIO (but not from IMPA)	FROM IMPA	FROM ABROAD	FROM BRAZIL EXCEPT RIO DE JANEIRO
22	19	10	15

FROM BRAZIL: 56, being 22 from Rio de Janeiro, 19 from IMPA and 15 from other states of Brazil

From abroad: 10

Total of participants: 66

Financial balance from the brazilian side.

IMPA: 13.350,00
CAPES: R$ 7.480,00

TOTAL: 20.830,00

ANNEXE 4

INSTITUTO NACIONAL DE MATEMÁTICA PURA E APLICADA

IMPA, Rio de Janeiro, Brazil
November 16 - 26, 2010

INSTITUT FOURIER

Geometric Analysis

Minicourses

Conformal deformations of metrics and applications to rigidity of closed manifolds,
Zindine Djadli - Université de Grenoble, Institut Fourier

Curvature flows and scalar curvature problems,
Fernando Codá Marques - IMPA

Geometry of Ricci solitons for Ricci flows,
Detang Zhou - Universidade Federal Fluminense - UFF

Variants of Ricci flow with surgery and applications,
Laurent Bessiéres - Université de Grenoble, Institut Fourier

Scientific and Organizing Committee
Pierre Bérard - Institut Fourier
Gérard Besson - Institut Fourier
Fernando Codá Marques - IMPA

design sergio c. vaz

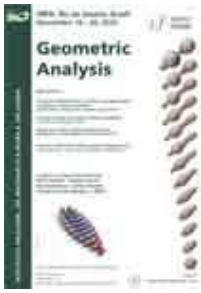
Partial financial support available for selected Ph.D. students

further information:
dac@impa.br or
http://www.impa.br/opencms/pt/eventos/store/evento_1003

CAPES

support
ARCUS RRhA-BR 2008-2010

Eventos



Workshop "Geometric Analysis",em parceria com o Institut Fourier (Grenoble)

IMPA, Rio de Janeiro, de 16/11 até 26/11

The purpose of this workshop is to bring together specialists from Brazil and from France, and their PhD students, to report on recent developments in geometric analysis and in particular in the domains of Ricci Flow and Conformal deformations and their applications to geometry. The workshop will take place at IMPA, and aims at developing the scientific interactions between Institut Fourier (Université de Grenoble) and the Brazilian community. It will consist of four mini-courses and some invited lectures. Ample time will be left for interactions and discussions. We hope to be able to provide financial support to some Ph.D. students.

Scientific and Organizing Committee

Minicourses

Speakers

Program NEW

Certificates NEW

Registration

Video

List of all registered partipants

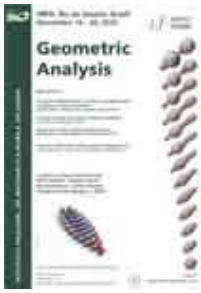
Contact

Accommodation

The "Workshop on Geometric Analysis" will be supported by IMPA and by the collaborative research programmes ARCUS Rhône-Alpes-Brésil and Math-AmSud.

Voltar

Eventos



Workshop "Geometric Analysis",em parceria com o Institut Fourier (Grenoble)

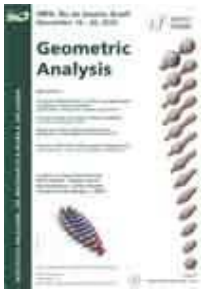
IMPA, Rio de Janeiro, de 16/11 até 26/11

Scientific and Organizing Committee

Fernando Codá Marques (IMPA)
Pierre Bérard (Institut Fourier)
Gérard Besson (Institut Fourier)

Voltar

Eventos



Workshop "Geometric Analysis",em parceria com o Institut Fourier (Grenoble)

IMPA, Rio de Janeiro, de 16/11 até 26/11

Minicourses

First week

Conformal deformations of metrics and applications to rigidity of closed manifolds,
by Zindine Djadli (Université de Grenoble, Institut Fourier)

Curvature flows and scalar curvature problems,
by Fernando Codá Marques (IMPA)

Second week

Variants of Ricci flow with surgery and applications,
by Laurent Bessiéres (Université de Grenoble, Institut Fourier)

Geometry of Ricci solitons for Ricci flows,
by Detang Zhou (Universidade Federal Fluminense - UFF)

Abstracts

Voltar

1 Summaries for the mini-courses

1.1 Variants of Ricci flow with surgery and applications

Laurent Bessières (Université de Grenoble, Institut Fourier)

These lectures are devoted to the celebrated Ricci flow with surgery constructed by G. Perelman, and applications. We present the main ideas of Perelman's work, and develop two variants of its construction, which we call Ricci flow with bubbling-off and surgical solutions. We explain how to deduce the proof of the Geometrisation conjecture from this, and as a conclusion we present some recent developments in the classification of complete 3- manifolds with uniformly positive scalar curvature.

1.2 Conformal deformations of metrics and applications to rigidity of closed manifolds

Zindine Djadli (Université de Grenoble, Institut Fourier)

In these lectures we will focus on some recent results in conformal geometry. First we will introduce the topic and recall some useful tools in conformal geometry (conformally invariant operators, conformal invariant associated to these operators, geometric PDE's, ...). Then we will present the proof of the well known Yamabe problem. After that we will introduce some higher order geometric operators and their associated conformal invariants. Then we will present an analogue of the Yamabe problem for these operators and give some applications to rigidity issues in positive curvature mainly obtained in the last five years.

1.3 Geometry of Ricci solitons for Ricci flows

Detang Zhou (Universidade Federal Fluminense - UFF)

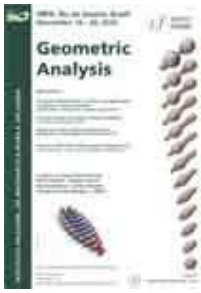
The notion of Ricci solitons are natural generalizations of Einstein metrics. Ricci solitons also correspond to self-similar solutions of Hamilton's Ricci flow, and often arise as limits of dilations of singularities in the Ricci flow. In this minicouse, I will introduce the basic definitions, important examples and classification results. We will focus our attention on complete gradient shrinking Ricci solitons and discuss some of the recent progress, including the classifications in dimension three, and asymptotic behavior of potential functions as well as volume growths of geodesic balls in higher dimensions and its applications.

1.4 Curvature flows and scalar curvature problems

Fernando Codá Marques (IMPA)

In these lectures we will focus on some applications of curvature flows to scalar curvature problems. We will begin by describing a proof of the Penrose Conjecture due to Huisken and Ilmanen. This conjecture has its source in General Relativity - it compares the total energy of a relativistic gravitationally isolated system with the area of the biggest black hole inside - and can be proved with the inverse mean curvature flow (IMCF) of surfaces. We will discuss the calculation through IMCF of the Yamabe invariant of $\mathbb{R}P^3$, and give an application of Ricci flow to a rigidity theorem for $\mathbb{R}P^3$. This relates the scalar curvature and the area of minimizing projective planes. If time permits we will describe other recent results (connectedness of the space of metrics with positive scalar curvature, nonrigidity of the hemisphere, ...).

Eventos



Workshop "Geometric Analysis",em parceria com o Institut Fourier (Grenoble)

IMPA, Rio de Janeiro, de 16/11 até 26/11

Speakers

Tuesday 16

Embedding Riemannian manifolds by their Heat Kernel
Gérard Besson

Wednesday 17

Geometry of gradient Ricci solitons whose curvatures are not nonnegative
Chih-Wei Chen

Friday 19

Sequences of Ricci Flows in dimension 3, with some applications.
Thomas Richard

Local rigidity and bifurcation for equivariant geometric variational problems
Paolo Piccione

Monday 22

Blow-up phenomena for scalar-flat metrics on manifolds with boundary
Sérgio Almaraz

Tuesday 23

Constant mean curvature surfaces in metric Lie groups
William Meeks

Wednesday 24

Ricci-Yang-Mills flows and the boundary of Anosov metrics
Rafael Ruggiero

Thursday 25

Fourth order curvature flows and geometric applications
Vincent Bour

Maximal Analytic Extensions of the Emparan-Reall Black Ring

Julien Cortier

Orbifold degeneration of conformally compact Einstein metrics
Frederico Girao

Friday 26

Steady gradient Ricci soliton with curvature in L^1
Alix Deruelle

A Differentiable Classification Result for Complete Submanifolds
Ezequiel Rodrigues

Embeddings by eigenfunctions II, Applications to imaging.
Pierre Bérard

Voltar

Workshop "Geometric Analysis", em parceria com o Institut Fourier (Grenoble)

IMPA, Rio de Janeiro, de 16/11 até 26/11.

Program at a glance

Hour	Tuesday 16	Wednesday 17	Thursday 18	Friday 19
10:00 - 10:30	**Registration**			
10:30 - 11:50	Zindine Djadli	Zindine Djadli	Zindine Djadli	Thomas Richard (10:30 - 11:30)
11:50 - 13:30	**Lunch**			
13:30 - 14:50	Fernando Codá	Fernando Codá	**Free afternoon**	Fernando Codá
14:50 - 15:30	**Coffee Break**			**Coffee Break**
15:30 - 16:30	Gérard Besson	Chih-Wei Chen		Paolo Piccione
17:00	**Cocktail**			

Hour	Monday 22	Tuesday 23	Wednesday 24	Thursday 25	Friday 26
10:30 - 11:50	Laurent Bessières	Laurent Bessières	Laurent Bessières	Vincent Bour (10:30 - 11:30)	Alix Deruelle (10:30 - 11:30)
11:50 - 13:30	**Lunch**				
13:30 - 14:50	Detang Zhou	Detang Zhou	Detang Zhou	Julien Cortier (13:30 - 14:30)	Ezequiel Rodrigues (13:30 - 14:30)
14:50 - 15:30	**Coffee Break**				
15:30 - 16:30	Sérgio Almaraz	William Meeks	Rafael Ruggiero	Frederico Girao	Pierre Bérard
16:45 - 17:45			Jorge Lira		

W. Geometric Analysis em parceria com o Institut Fourier

16 a 26 de Novembro, 2010

Nome	Instituição
Abdênago Alves de Barros	Universidade Federal do Ceará
Abiel Costa Macedo	Universidade Federal de Pernambuco
Acir Carlos da Silva Junior	Instituto de Matematica Pura e Aplicada
Adilson Lopes dos Santos	Universidade Federal do Rio de Janeiro
Alan Gerardo Reyes Figueroa	Instituto de Matematica Pura e Aplicada
Aldir Brasil Junior	Universidade Federal do Ceará
Aldo Peres Campos e Lopes	Universidade Federal de Minas Gerais
Alexandre de Sousa Mota	Universidade Federal do Ceará
Alix Deruelle	Université de Grenoble
Almir Rogério Silva Santos	Universidade Federal de Sergipe
Ana Maria Menezes de Jesus	Instituto de Matematica Pura e Aplicada
Andrea Luiza Gonçalves Martinho	Universidade Federal do Rio de Janeiro
Areli Vázquez	Universidade Federal Fluminense
Castillon	Université Montpellier 2
Celso Melchiades Doria	Universidade Federal de Santa Catarina
Chih-Wei Chen	Université Joseph Fourier
Cicero Pedro Aquino	Universidade Federal do Ceará
Claudemir Silvino Leandro	Instituto de Matemática e Estatística
Cristhabel J. C. Vasquez	Universidade Federal Fluminense
Cristina Levina Marques	Instituto de Matematica Pura e Aplicada
Daniel Florentiu Cibotaru	Universidade Federal Fluminense
Detang Zhou	Universidade Federal Fluminense
Dorel Fetcu	Instituto de Matematica Pura e Aplicada
Ernani de Sousa Ribeiro Júnior	Universidade Federal do Ceará
Ezequiel Rodrigues Barbosa	Universidade Federal de Minas Gerais
Fabiana Alves dos Santos	Universidade Federal do Ceará
Feliciano Marcilio Aguiar Vitório	Universidade Federal de Alagoas
Fernando Codá dos Santos Cavalcanti Marques	Instituto de Matematica Pura e Aplicada
Fernando Manfio	USP - Instituto de Ciências Matemáticas e Computação São Carlos
Flávio França Cruz	Universidade Federal do Ceará
Francisco Vanderson Moreira de Lima	Universidade Federal do Ceará
Frederico Vale Girão	Universidade Federal do Ceará
Gérard Besson	Université Joseph Fourier
Hilário Alencar da Silva	Universidade Federal de Alagoas
Ivaldo Paz Nunes	Instituto de Matematica Pura e Aplicada
Jobson de Queiroz Oliveira	Universidade Federal do Ceará
Jorge Herbert Soares de Lira	Universidade Federal do Ceará
Julien Cortier	Université Montpellier 2
Karolliny Danielle Santos	Universidade Estadual de Montes Claros
Laurent Bessières	Université de Grenoble
Leandro A. Lichtenfelz	Instituto de Matemática e Estatística
Leandro Aguiar Fernandes	Instituto Politécnico do Rio de Janeiro
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Lucas Coelho Ambrozio	Instituto de Matematica Pura e Aplicada
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Maria Cristiane Magalhães Brandão	Universidade Federal do Ceará
Martin de Borbon	Instituto de Matematica Pura e Aplicada
Matheus Brioschi Herkenhoff Vieira	Universidade Federal do Espirito Santo
Michela Zedda	Instituto de Matemática e Estatística
Nicolau Sarquis Aiex	Universidade Federal do Rio de Janeiro
Paolo Piccione	Instituto de Matemática e Estatística
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Robson Martins de Mesquita	Universidade Federal do Tocantins
Sergio de Moura Almaraz	Universidade Federal Fluminense
Stefano Nardulli	Università di Palermo
Thomas Richard	Université Joseph Fourier
Tito Mejia Paredez	Universidade Federal Fluminense
Vincent Bour	Université Joseph Fourier
Vladimir Rosas Meneses	Universidad Nacional de San Agustin
William Meeks III	Univ. of Massachusetts at Amherst
Xu Cheng	Universidade Federal Fluminense
Zindine Djadli	Université Joseph Fourier

Budget

ARCUS Rhône-Alpes -- Brésil (séjour et/ou voyage): P. Bérard, L. Bessières, V. Bour, A. Deruelle, Z. Djadli.

MATH AmSud (billets d'avion): P. Bérard, L. Bessières, T. Richard.

ANR (voyage/séjour): G. Besson, C.W. Chen.

IMPA: 45.000 reais.
- Soutien aux jeunes mathématiciens brésiliens.
- Soutien (frais de séjour) à des participants étrangers: J. Cortier (U. Montpellier), S. Narduli (Italie).