Arnab Roy

Curriculum Vitae

Institute of Mathematics of the Czech Academy of Sciences
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Personal Information

Nationality	Indian.
Date of Birth	01 June 1991.
Sex	Male
Languages	English, Hindi, Bengali.

Research Interests

Partial Differential Equations

- Fluid-Structure Interaction: Modelling and mathematical analysis of FSI problems, Existence, uniqueness, singular limits and long time behaviour of the solutions.
- Control of PDE : Controllability, Stabilizability and Optimal control problem for fluid models (Incompressible, Compressible Navier-Stokes), Fluid-Structure interaction models.

Employment

Jan. 2020 - Present **Post Doctoral Fellow**, *Institute of Mathematics of the Czech Academy of Sciences*, Prague, Czech Republic.

Advisor: Prof. Šarka Nečasová.

Team: Evolution Differential Equations (EDE).

Sep. 2018 - Aug. 2019 **Post Doctoral Fellow**, *Institut Élie Cartan de Lorraine (IECL) and Inria*, Nancy, France.

Advisor: Prof. Takéo Takahashi.

Team: EDP (IECL) and SPHINX (Inria).

Education

2015–2018 **PhD**, *Tata Institute Of Fundamental Research-CAM*, Bangalore,India.

Title: *Existence, Controllability and Stabilization of fluid models.*

Thesis Advisor: Prof. Mythily Ramaswamy.

Date of Defense: 10 July 2018.

2014–2015 **Master Degree Dissertation**, *Tata Institute Of Fundamental Research-CAM*, Bangalore,India.

Title: *Existence and regularity of nonlinear Boussinesq system.*

Thesis Advisor: Prof. Mythily Ramaswamy.

2012–2014 **M.Sc in Mathematics**, *Tata Institute Of Fundamental Research-CAM*, Bangalore,India, *1st class with distinction*.

2009–2012 **B.Sc in Mathematics**, *University of Calcutta*, Kolkata,India, *1st class*.

Accepted Publications

- Boundary feedback stabilization of the Boussinesq system with mixed boundary conditions, with M. Ramaswamy and J.-P. Raymond, *J. Differential Equations 266 (2019), no. 7, 4268–4304 , 2019.*
  https://doi.org/10.1016/j.jde.2018.09.038
- Local null controllability of a rigid body moving into a Boussinesq flow, with T. Takahashi, *Math. Control Relat. Fields, December 2019, Volume 9, Issue 4, 793–836.*
  https://www.aimsciences.org/article/doi/10.3934/mcrf.2019050
- Stabilization of a rigid body moving in a compressible viscous fluid, with T. Takahashi, *J. Evol. Equ. (2020).*
  https://doi.org/10.1007/s00028-020-00574-1
- Remark on the global null controllability for a viscous Burgers-particle system with particle supported control, with M. Ramaswamy and T. Takahashi, *Applied Mathematics Letters, September 2020, Volume 107.*
  https://doi.org/10.1016/j.aml.2020.106483
- Maximal-in-time existence and uniqueness of strong solution of a 3d fluid-structure interaction model, with D. Maity and J. -P. Raymond, *SIAM J. Math. Anal., 52(6), 6338–6378.*
  https://epubs.siam.org/doi/abs/10.1137/18M1178451
- Self-propelled motion of a rigid body inside a density dependent incompressible fluid, with Š. Nečasová, M. Ramaswamy and A. Schlömerkemper. Accepted in Math. Model. Nat. Phenom.
  https://doi.org/10.1051/mmnp/2020052

Submitted

- Measure-valued solutions and weak-strong uniqueness for the incompressible inviscid fluid-rigid body interaction, with M. Caggio, O. Kreml, Š. Nečasová and T. Tang.
  https://arxiv.org/pdf/2006.06975v1.pdf
- Existence and uniqueness of maximal strong solution of a 1D Blood flow in a network of vessels, with D. Maity and J. -P. Raymond.
  https://hal.archives-ouvertes.fr/hal-02912208/document
- Existence of strong solutions for a system of interaction between a compressible viscous fluid and a wave equation, with D. Maity and T. Takahashi.
  https://hal.archives-ouvertes.fr/hal-02908420/document
- Approximate controllability and stabilizability of a linearized system for the interaction between a viscoelastic fluid and a rigid body, with D. Mitra and T. Takahashi.
  https://hal.archives-ouvertes.fr/hal-02987407/document

Long Term Research Visits (During Ph.D.)

May 2018 - June 2018	Institute for Mathematics, University of Würzburg, Germany.
April 2018-May 2018	Institut de Mathématiques de Toulouse, Paul Sabatier University,Toulouse, France.
Oct. 2017 - Nov. 2017	Institut Élie Cartan de Lorraine, Nancy, France.

Sept. 2017 - Oct. 2017 Institut de Mathématiques de Toulouse, Paul Sabatier University,Toulouse, France.

Oct. 2016 - Nov. 2016 Institut Élie Cartan de Lorraine, Nancy, France.

Sept. 2016 - Oct. 2016 Institut de Mathématiques de Toulouse, Paul Sabatier University.

Long Term Research Visits (After Ph.D.)

Nov. 2019 - Dec. 2019 Tata Institute Of Fundamental Research, Bangalore, India

Oct. 2019 - Nov. 2019 Indian Institute Of Technology-Bombay, Mumbai, India

Invited Talks

- Stabilization of a rigid body moving in a compressible fluid, *IIT-Bombay*, Mumbai, India, Nov 13, 2019.
- Stabilization of a rigid body moving in a compressible fluid, *IFSMACS Réunion*, Institut Élie Cartan de Lorraine, Nancy, France, Jan 21-22, 2019.
- Local in time strong solution of a 3D FSI system, *Institute of Mathematics,* Czech Academy of Sciences, Dec 18, 2018
- Local in time strong solution of a 3D FSI system, *Institute for Mathematics,* University of Würzburg, June 08, 2018
- Null controllability of a rigid body moving into a Boussinesq flow, *Poster presentation*, Institut de Mathmatiqués de Bordeaux, France, Conference on FSI.
- Existence, Regularity and Stabilization Results of Boussinesq System, *AIRBUS Investigators' Meeting,* TIFR - CAM, Bangalore, August 21, 2017.
- Existence and regularity of Linearized Boussinesq Equations in Two Dimension, *In-House Symposium*, TIFR - CAM, Bangalore, August 21, 2015.

Teaching Experience

- Fall 2017 : *Linear Partial Differential Equations*, Master level (Teaching Assistant), TIFR- CAM.
- Spring 2017 : *PDE III*, Master level (Teaching Assistant), TIFR- CAM.
- Spring 2016 : *PDE III*, Master level (Teaching Assistant), TIFR- CAM.
- Fall 2015 : *Real Analysis*, Master level (Teaching Assistant), TIFR- CAM.
- Fall 2014 : *Complex Analysis*, Master level (Teaching Assistant), TIFR- CAM.

Computer skills

- Markup Language: Latex
- Operating Systems: Unix/Linux, Windows.

References

- **Prof. Šarka Nečasová**
  Institute of Mathematics of the Czech Academy of Sciences,
  Žitná 25, CZ - 115 67,

Praha 1, Czech Republic.
matus@math.cas.cz.

- **Prof. Mythily Ramaswamy**
  TIFR - CAM,
  Bangalore - 560065,
  Karnataka, India.
  mythily@math.tifrbng.res.in.
- **Prof. Jean Pierre Raymond**
  Institut de Mathmatiques de Toulouse,
  Université Paul Sabatier & CNRS,
  31062 Toulouse Cedex, France.
  raymond@math.univ-toulouse.fr.
- **Prof. Takéo Takahashi**
  Institut Élie Cartan de Lorraine,
  BP 239, 54506 Vandœuvre-lés-Nancy,
  Nancy, France.
  takeo.takahashi@inria.fr.