

# Internatinal Workshop on Mathematical Fluid Dynamics

Waseda University, March 8–16, 2010

## March 8 and 9 : Mini Courses and Scientific Talks

Nishi-Waseda Campus 52 bldg. – 201 room

### Lectures: 10:00-16:30

- G. P. Galdi: The Navier-Stokes Equations: A Mathematical Analysis
- M. Yamazaki: Real Analytic Approach to the Navier-Stokes Equations

Mini Course	10:00–11:30	11:30-13:00	13:00-14:30	14:30-15:00	15:00-16:30
March 8(Monday)	Galdi	lunch break	Galdi	coffee break	Yamazaki
March 9(Tuesday)	Yamazaki	lunch break	Yamazaki	coffee break	Galdi

### Scientific Talks: 17:00–18:00

#### March 8th

- K. Götze(Darmstadt): Free movement of a rigid body in a generalized Newtonian fluid
- Y. Saito(Waseda): Analysis of Stokes equations by penalty method
- C. Trunk(Darmstadt): On the Navier-Stokes equations with (autonomous) Oseen condition in the exterior of a rotating obstacle

#### March 9th

- R. Ingram(Pittsburgh): A limitation of the Brinkman model
- R. Takada(Sendai): Counterexamples of commutator estimates in the Besov and the Triebel-Lizorkin spaces related to the Euler equations
- K. Soga(Waseda): Stochastic and variational characterization of a difference scheme for nonlinear PDEs

### Conference: March 10 – 13

Nishi-Waseda Campus 63 bldg. – 03 and 04 rooms

#### March 10

9:50–10:00 Opening

10:00–10:30 G. P. Galdi(Pittsburgh): Steady-state Navier-Stokes flows past a rotating body: Leray solutions are physically reasonable

10:30–11:00 M. Kyed(Aachen): Asymptotic behavior of a Leray solution to the steady-state Navier-Stokes flow around a rotating obstacle

- 11:00–11:30 coffee break
- 11:30–12:00 J. Escher(Hannover): Well-posedness, instabilities, and bifurcation results for the flow in a rotating Hele-Shaw cell
- 12:00–12:30 J. Saal(Konstanz): Local and global well-posedness for a hyperbolic fluid model
- 12:30–14:00 lunch break
- 14:00–14:30 T. Kambe(Tokyo): Variational formula of an ideal fluid and fluid Maxwell equations
- 14:30–15:00 O. N. Kirillov(Darmstadt): Multiple eigenvalues and singularities in MHD: Oscillatory dynamo and helical magnetorotational instability
- 15:00–15:30 coffee break
- 15:30–16:00 H. Abels(Regensburg): Double obstacle limit for a Navier-Stokes/Cahn–Hilliard system
- 16:00–16:30 H. Heck(Darmstadt): On the stationary flow of viscous incompressible fluids past an obstacle
- 16:30–17:00 coffee break
- 17:00–17:20 H. Koba(Tokyo): Global solvability of the rotating Navier-Stokes-Boussinesq equation with stratification effect with decaying initial data
- 17:20–17:40 T. Hansel(Darmstadt): Non-autonomous Ornstein–Uhlenbeck type operaton in exterior domains
- 17:40–17:50 break
- 17:50–18:10 Y. Naito(Waseda): On Navier-Stokes equations with Robin boundary condition in a perturbed half-space
- 18:10–18:30 K. Oeda(Waseda): Stationary problem for a cross-diffusion system of a prey-predator type with a protection zone

### March 11

- 10:00–10:30 J. Prüß(Halle): Incompressible Two-Phase Flows with Phase Transition and Surface Tension
- 10:30–11:00 S. Shimizu(Shizuoka): On the local in time solvability of the Navier-Stokes equations with phase transition
- 11:00–11:30 coffee break
- 11:30–12:00 T. Miyazaki(Tokyo): Statistics of quasi-geostrophic point vortices – Equilibrium of interacting vortex clouds –
- 12:00–12:30 Y. Yatsuyanagi(Shizuoka): Characterization of two-dimensional point-vortex system in terms of statistically-defined temperature
- 12:30–14:00 lunch break

- 14:00–14:30 H. Okamoto(Kyoto): On Stokes’s drift
- 14:30–15:00 N. Saito(Tokyo): A finite–volume approximation for a degenerate Keller-Segel system
- 15:00–15:30 coffee break
- 15:30–16:00 R. Zacher(Halle): Strong well–posedness for a diffuse interface model for the two–phase flow of compressible viscous fluid
- 16:00–16:30 Y. Kagei(Fukuoka): Asymptotic behavior of solutions of the compressible Navier-Stokes equation around a parallel flow
- 16:30–17:00 coffee break
- 17:00–17:20 S. Meyer(Halle): On two–phase flows with surface viscosity
- 17:20–17:40 Y. Nakata(Waseda): Effect of three time delays for a viral dynamics with immune response
- 17:40–18:00 D. Götz(Darmstadt): Temporal semi–discretization of equations describing generalized Newtonian fluids
- 19:00– Reception

### March 12

- 10:00–10:30 H. Beirão da Veiga(Pisa): On the inviscid limit for incompressible fluid flows
- 10:30–11:00 A. L. Silvestre(Lisbon): Steady solutions with finite kinetic energy for the 3-D Navier-Stokes equations in exterior domains
- 11:00–11:30 coffee break
- 11:30–12:00 M. Hieber(Darmstadt): TBA
- 12:00–12:30 M. Geissert(Darmstadt): Weak Neumann implies Stokes
- 12:30–14:00 lunch break
- 14:00–14:30 R. Farwig(Darmstadt): Spectral properties of the Stokes and Oseen operator with rotation effect in  $L^q$ -spaces
- 14:30–15:00 T. Kubo(Tsukuba): Criterion for stability of the stationary solution to the Navier-Stokes equations in half-space
- 15:00–15:30 coffee break
- 15:30–16:00 O. Sawada(Darmstadt): Strong solutions to the Euler equations with bounded initial data
- 16:00–16:30 H. Yoshimura(Waseda) Dirac structures, the Hamilton-Pontryagin principle on Lie groups and applications to incompressible ideal fluids
- 16:30–17:00 coffee break

- 17:00–17:20 A. Sasaki(Waseda): A generalized Cartan decomposition for the non-symmetric space  $SL(2n + 1, \mathbb{C})/Sp(n, \mathbb{C})$
- 17:20–17:40 C. Yang(Darmstadt): Relation of the covariant and Lie derivatives and its application to Hydrodynamics
- 17:40–18:00 S. Kawano(Waseda): A remark on the uniqueness of positive solutions to semilinear elliptic equations with double power nonlinearities

### March 13

- 10:00–10:30 W. Stannat(Darmstadt): Stochastic Navier-Stokes-Coriolis equations
- 10:30–11:00 N. Yoshida(Kyoto): Stochastic power law fluids: The existence and the uniqueness of the weak solution
- 11:00–11:30 coffee break
- 11:30–12:00 P. Billant(Paris): Vortex interactions and instabilities in stratified and rotating fluids
- 12:00–12:30 Y. Fukumoto(Fukuoka): Lagrangian approach to wave interactions on vortices and weakly nonlinear stability of an elliptical flow
- 12:30–14:00 lunch break
- 14:00–14:30 D. Bothe(Darmstadt): On multicomponent two–phase flows with mass transfer
- 14:30–15:00 Y. Maekawa(Kobe): Three dimensional stability of the axisymmetric Burgers vortex
- 15:00–15:30 coffee break
- 15:30–16:00 M. Wilke(Halle): Qualitative behaviour of solutions for the two-phase Navier-Stokes equations with surface tension
- 16:00–16:30 N. Nakano(Hiyoshi): On a mathematical analysis of a flow of inhomogeneous incompressible fluid–like bodies
- 16:30–17:00 coffee break
- 17:00–17:20 M. Köhne(Darmstadt):  $L_p$  theory for two-phase flows with soluble surfactant
- 17:20–17:40 M. Sasada(Tokyo): Nonlinear diffusion equations derived from nonreversible particle systems
- 17:40–18:00 M. Sauer(Darmstadt): Improved moment estimates for invariant measures of semilinear SPDE
- 18:00– Closing

### March 15 and 16 : Mini Courses and Scientific Talks Nishi-Waseda Campus 52 bldg. – 201 room

**Lectures: 10:00-16:30**

- J. Prüß: Maximal Regularity, Quasilinear Parabolic Systems, and Applications to Two-Phase Problems
- W. Stannat: Stochastic Partial Differential Equations

<b>Mini Coures</b>	10:00–11:30	11:30-13:00	13:00-14:30	14:30-15:00	15:00-16:30
March 15(Monday)	Prüß	lunch break	Stannat	coffee break	Prüß
March 16(Tuesday)	Stannat	lunch break	Prüß	coffee break	Stannat

**Scientific Talks: 17:00–18:00**

**March 15th**

- T. Okabe(Waseda): A reproductive property of the time dependent boundary value problem to the Navier-Stokes equations under the general flux condition
- R. Schulz(Darmstadt): Concentration and diffusion effects of heat convection in an incompressible fluid
- N. Ito(Waseda): Chain homotopy maps of Khovanov homology

**March 16th**

- N. Ikoma(Waseda): Nonlinear scalar field equations in  $\mathbf{R}^N$  - a mountain pass approach
- M. Nesensohn(Darmstadt): The Dirichlet Laplace operator on Sobolev spaces of higher order
- Y. Enatsu(Waseda): Global asymptotic stability for a class of epidemic models with delays

**Organization Committee**

T. Funaki (Tokyo), Y. Giga (Tokyo), T. Hishida (Nagoya), H. Kozono (Sendai), T. Nishida (Waseda), Y. Shibata (Waseda).

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