Research Report 2016

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Publications

1. N. Bez, C. Jeavons, and T. Ozawa
Some sharp bilinear space-time estimates for the wave equation,
Mathematika, **62**(2016), 719-737. DOI:10.1112/S0025579316000012

2. Y. Cho, T. Ozawa, and C. Wang
Finite Time blowup fot the fourth-order NLS,
Bulletin of the Korean Mathematical Society, **53**(2016), 615-640.
http://dx.doi.org/10.4134/BKMS.2016.53.2.615

3. J. Fan and T. Ozawa
Remarks on regularity criteria for harmonic heat flow and related system,
International Journal of Mathematical Analysis, **10**(2016), no.16, 749-755.
http://dx.doi.org/10.12988/ijma.2016.6351

4. J. Bellazzini, M. Ghimenti, and T. Ozawa
Sharp lower bounds for Coulomb energy,
Math. Research Letters, **23**(2016), 621-632. http://dx.doi.org/10.4310/MRL.2016.v23.n3.a2

5. Y. Cho, G. Hwang, and T. Ozawa
On small data scattering of Hartree equations with short-range interaction,
Comm. Pure Appl. Anal., **15**(2016), 1809-1823.

6. T. Ozawa and N. Visciglia
An improvement on the Brézis-Gallouët technique for 2D NLS and 1D half-wave equation,
Ann. Inst. Henri Poincaré, Analyse non linéaire, **33**(2016),1069-1079.

7. J. Fan and T. Ozawa
Global strong solutions to the time-dependent Ginzburg-Landau model in superconductivity with four new gauges,
Nonlinear Analysis and Differential Equations, **4**(2016), no.11, 513-519.
http://dx.doi.org/10.12988/nade.2016.6754

8. K. Fujiwara and T. Ozawa
Finite time blowup of solutions to the nonlinear Schrödinger equation without gauge invariance,
J. Math. Phys., **57**(2016), No.8, 082103, 8pp. http://dx.doi.org/10.1063/1.4960725

9. M. Hayashi and T. Ozawa
Well-posedness for a generalized derivative nonlinear Schrödinger equation,
J.Differential Equations, **261**(2016), 5425-5445. http://doi.org/10.1016/j.jde.2016.08.018

10. J. Fan and T. Ozawa
Some remarks on gauge choice and Navier-Stokes equations,
Nonlinear Analysis and Differential Equations, **4**(2016), no.14, 659-667.
https://doi.org/10.12988/nade.2016.6982

11. K. Yuasa and T. Ozawa
Uncertainty relations in the framework of equalities,
J. Math. Anal. Appl., **445**(2017), No.1, 998-1012.

12. M. Hayashi and T. Ozawa
On Landau-Kolmogorov inequalities for dissipative operators,
Proc. AMS, **145**(2017), 847-852.

13. N. Ioku, M. Ishiwata, and T. Ozawa
Hardy type inequalities in L^p with sharp remainders,
J. Inequalities and Applications, (2017) 2017:5, DOI:10.1186/s13660-016-1271-1

14. J. Fan and T. Ozawa
Regularity criteria for Navier-Stokes and related systems,
Differential and Integral Equations, **30**(2017), 101-114.

15. J. Fan and T. Ozawa
Global well-posedness of weak solutions to the time-dependent Ginzburg-Landau model for superconductivity in $\mathbb{R}^2$,
International Journal of Mathematical Analysis, **11**(2017), no.4, 199-207.
https://doi.org/10.12988/ijma.2017.7110

Book

1. 小澤徹,サイエンス社,「数理物理学としての微分方程式序論」(in Japanese)
November 25, 2016, 192 pp.

Invited Talks

1. Centre International de Rencontres Mathématiques (CIRM)「Recent Trends in Nonlinear Evolution Equations」
April 7, 2016
CENTRE INTERNATIONAL DE RENCONTRES MATHEMATIQUES, Marseille, France,
“Quadratic interactions in Dispersive Systems.”

2. PDE Seminar
May 27, 2016
Hokkaido University
“Life span of solutions to nonlinear Schrödinger equations on torus.”

3. Seminar of Differential Equations
June 10, 2016
Osaka University
「等式の枠組から観た不確定性関係」

4. International Conference on Navier-Stokes equations and related PDEs：In honor of the 60th birthday of Professor Hi Jun Choe
June 25, 2016
NIMS, Daejeon, Korea
“Life span of solutions to nonlinear Schrodinger equations on torus.”

5. Recent Topics on Dispersive Equations
   August 30, 2016
   Chuo University
   “On Landau-Kolmogorov inequalities for dissipative operators.”

6. Nonlinear Wave and Dispersive Equations, Kyoto 2016
   September 6, 2016
   Kyoto University
   “Higher order fractional Leibniz estimates.”

7. New trends in Partial Differential Equations
   October 4, 2016
   Centro di Ricerca Matematica Ennio De Giorgi, Pisa, Italy
   “Uncertainty relations in the framework of equalities.”

8. Workshop on Differential Equations in Hiroshima
   October 14, 2016
   Hiroshima University
   “Critical Hardy inequalities.”

9. International Conference for the 70th Anniversary of Korean Mathematical Society
   October 22, 2016
   Seoul National University, Seoul, Korea
   “Uncertainty relations in the framework of equalities.”

10. The 13th Japanese-German International Workshop on Mathematical Fluid Dynamics
    December 1, 2016
    Technical University Darmstadt, Germany
    “Remarks on the Rellich inequality.”

11. Nonlinear Partial Differential Equations and Mathematical Physics Workshop
    December 7, 2016
    Tsinghua Sanya International Mathematics Forum, Sanya, China
    “ON LANDAU-KOLMOGOROV INEQUALITIES FOR DISSIPATIVE OPERATORS.”

12. Critical Exponents and Nonlinear Evolution Equation 2017
    February 2, 2017
    Tokyo University of Science
    “ON LANDAU-KOLMOGOROV INEQUALITIES FOR DISSIPATIVE OPERATORS.”

13. Zhejiang-Tohoku International Workshop for Nonlinear Partial Differential Equations 2017
    March 17, 2017
    Tohoku University
    “Hardy inqualities in $L^p(\mathbb{R}^n)$. ”

14. The 9th Nagoya Workshop on Differential Equations
    March 21, 2017
    Nagoya University
    “Remarks on Hardy inequalities in $L^p(\mathbb{R}^n)$.”

15. co-presence 研究会
March 29, 2017
The University of Tokyo Kashiwanoha Campus Station Satellite
「数理物理学に於ける co-presence」

Conference Organized

1. Nonlinear Science Colloquium
Waseda University

April 14, 2016　Mashahiro Yamamoto (The University of Tokyo)
「偏微分方程式の逆問題の数理と応用」(in Japanese)
May 30, 2016　Horoshi Suito (Okayama University)
「循環器系疾患に関わる流体力学的問題」(in Japanese)
November 23, 2016　Kenji Takizawa (Waseda University)
「Space-Time 法による流体シミュレーションへの挑戦」(in Japanese)

2. International Workshop on "Fundamental Problems in Mathematical and Theoretical Physics"
Top Global University Project, Waseda University
July 20-22, 2016
04 Conference Room, 1st Floor, 55 Bldg. Waseda University

3. The 41st Sapporo Symposium on Partial Differential Equations
August 7-11, 2016
Hokkaido University

4. Mathematical Analysis for Stability in Nonlinear Dynamics －in honor of Professor Vladimir Georgiev on his 60th birthday－
August 23-27, 2016/8/23-27
Hokkaido University

Research Summary

- We have obtained various sharp bilinear space-time estimates for the wave equation.

- We have obtained sharp lower bounds for Coulomb energy.

- We proved global well-posedness in the Sobolev space $H^2(\mathbb{R}^2)$ of order 2 for the Cauchy problem for the quartic nonlinear Schrödinger equation in a general domain in $\mathbb{R}^2$ (affirmative answer to Tsutsumi's problem). We improved an exponential upper bound in time of the uniform norm of global solutions for the cubic nonlinear Schrödinger equation in a general domain in $\mathbb{R}^2$ to a linear upper bound in time (affirmative answer to Brézis-Gallouët's problem).