Research activity

Published Papers

1) Stef Graillat, Christoph Lauter, PING Tak Peter Tang, Naoya Yamanaka and Shin'ichi Oishi, "Efficient Calculations of Faithfully Rounded l_2-Norms of n-Vectors", ACMTransactions on Mathematical Software, Vol. 41 Issue 4, 24:1--24:20 October 2015.

2) Katsuhisa Ozaki, Takeshi Ogita, Florian Bünger and Shin'ichi Oishi, "Accelerating interval matrix multiplication by mixed precision arithmetic", Nonlinear Theory and Its Applications, Vol. 6, No. 3, pp. 364-376, 2015.

3) Katsuhisa Ozaki, Takeshi Ogita, and Shin'ichi Oishi, "Improvement of error-free splitting for accurate matrix multiplication". Journal of Computational and Applied Mathematics, Vol. 288, pp. 127-140, 2015.

4) Katsuhisa Ozaki, Florian Bünger, Takeshi Ogita, Shin'ichi Oishi and Siegfried M. Rump, "Simple floating-point filters for the two-dimensional orientation problem". BIT Numerical Mathematics. 10.1007/s10543-015-0574-9.

5) Kazuaki Tanaka, Kouta Sekine, Makoto Mizuguchi, Shin'ichi Oishi,"Estimation of the Sobolev embedding constant on domains with minimally smooth boundary using extension operator", Journal of Inequalities and Applications, 2015:389, 2015.

6) Atsushi Minamihata, Kouta Sekine, Takeshi Ogita, Siegfried M. Rump, Shin'ichi Oishi,"Improved error bounds for linear systems with H-matrices", NOLTA, IEICE, Vol.6, No.3, pp.377-382, 2015.

7) Kazuaki Tanaka, Kouta Sekine, Makoto Mizuguchi, Shin'ichi Oishi,"Numerical verification for positiveness of solutions to semilinear elliptic problems", JSIAM Letters, Vol.7, pp.73-76, 2015.

8) N. Hoffman, K. Ichihara, M. Kashiwagi, H. Masai, S. Oishi, A. Takayasu,"Verified computations for hyperbolic 3-manifolds", Exp. Math., Vol. 25, Issue 1, pp.66-78, 2015.

Invited Talks

1) Numerical Verification of Eigenvalue Problems and Its Applications, EPASA2015 @Tsukuba, Tsukuba University.

2) Constructive Reals and Error Free Transformations, German-Japanese Workshop on Theory and Practice of Real Computation,
German-Japanese Workshop on Theory and Practice of Real Computation, Meiji University

3) Development of Theory and Techniques of Verified Numerical Computation, 3rd TWSIAM Annual Meeting, I-SHOU University.

Talks

1) 放物面コンパクト化を用いる常微分方程式の爆発解の数値的検証法,
日本応用数理学会 2016 年研究部会連合発表会, 神戸学院大学 ポートアイランドキャンパス,２０１６年３月５日(in japanese)

2) 講演題目：H 行列を用いた精度保証付き数値計算法の改良と新しい誤差評価式の提案, 日本応用数理学会 2016 年研究部会連合発表会, 神戸学院大学 ポートアイランドキャンパス, ２０１６年３月５日(in japanese)

3) Verified computations for solutions to semilinear parabolic equations using the evolution operator, Sixth International Conference on Mathematical Aspects of Computer and Information Sciences (MACIS2015), Berlin, Germany, November 12, 2015.

4) Numerical existence theorem for solutions of semilinear parabolic equations using the evolution operator, The 34th JSST Annual Conference International Conference on Simulation Technology (JSST2015), Toyama, Japan, October 12, 2015.

5) Numerical verification for positiveness of solutions to self-adjoint elliptic problems, The 34th JSST Annual Conference International Conference on Simulation Technology (JSST2015), Toyama, Japan, October 12, 2015.

6) Fast Enclosures of Solutions of Linear Systems with H-matrices,
The 34th JSST Annual Conference International Conference on Simulation Technology (JSST2015), Toyama, Japan, October 12, 2015.

7) Verified numerical enclosure of blow-up time for ODEs,
日本数学会 2015 年度秋季総合分科会, 京都産業大学, ２０１５年９月１６日 (in japanese)

8) 逐次添加法による三角形分割の Delaunay 性に対する数値的検証法,
2015 年日本応用数理学会年会, 金沢大学, ２０１５年９月１０日(in japanese)

9) LU 分解の事前誤差評価を用いた連立一次方程式の精度保証付き数値計算法における H 行列の性質を用いた正則性の検証法と誤差評価式の提案,
2015 年日本応用数理学会年会, 金沢大学, ２０１５年９月１０日(in japanese)

10) ある自己共役作用素から生成される解析半群を用いた半線形熱方程式の解の数値的検証法,
2015 年日本応用数理学会年会, 金沢大学, ２０１５年９月９日(in japanese)

11) 楕円型偏微分方程式の解の正値性に対する数値的検証法,
2015 年日本応用数理学会年会, 金沢大学, ２０１５年９月９日(in japanese)

12) カントロビッチの定理を用いた凸二次計画問題の精度保証,
2015 年日本応用数理学会年会, 金沢大学, ２０１５年９月９日(in japanese)

13) 常微分方程式の爆発解に対する精度保証付き数値計算,
2015 年日本応用数理学会年会, 金沢大学, ２０１５年９月９日(in japanese)

Research Outcome:
１）We proposed a method for computing an explicit value of the Sobolev type embedding constant on a Lipschitz domain.

２）We proposed a method to compute tight error bounds for linear systems by using H-matrix.

３）We proposed a computer-assisted proof method for proving the positiveness of a solution to semilinear elliptic Dirichlet boundary value problems.

４）We proposed a computer-assisted proof method for computing a blow-up solution to ordinary differential equations.

５）We proposed a computer-assisted proof method for an initial-boundary value problems.