Yoshihiro Kanno

Mathematics and Informatics Center,
The University of Tokyo,
Hongo 7-3-1, Tokyo 113-8656, Japan

E-mail: kanno@mist.i.u-tokyo.ac.jp
Phone: +81-3-5841-6913
http://www.mi-kanno.mist.i.u-tokyo.ac.jp/kanno/

April 11, 2025

EMPLOYMENT/POSITIONS

▸ **Professor**, The University of Tokyo,   Oct/2017 - present
Mathematics and Informatics Center, Tokyo, Japan

▸ **Associate Professor**, Tokyo Institute of Technology,   Apr/2016 - Sep/2017
Laboratory for Future Interdisciplinary Research of Science and Technology, Yokohama, Japan

▸ **Associate Professor**, Tokyo Institute of Technology,   Apr/2015 - Mar/2016
Materials and Structures Laboratory, Yokohama, Japan

▸ **Associate Professor**, The University of Tokyo,   Sep/2008 - Mar/2016
Department of Mathematical Informatics, Tokyo, Japan

▸ **Assistant Professor**, The University of Tokyo,   May/2006 - Aug/2008
Department of Mathematical Informatics, Tokyo, Japan

▸ **Assistant Professor**, Kyoto University,   Mar/2004 - Apr/2006
Department of Urban and Environmental Engineering, Kyoto, Japan

▸ **Postdoctoral Research Fellow**,
Japan Society of the Promotion of Sciences,   Oct/2002 - Feb/2004

    ▸ Division of Applied Mechanics,   Jun/2003 - Jan/2004
      Department of Civil Engineering,
      Instituto Superior Técnico, Lisbon, Portugal

    ▸ Mechanics of Building Structures Laboratory,   Apr/2003 - Feb/2004
      Department of Architecture and Architectural Engineering,
      Kyoto University, Kyoto, Japan

    ▸ Architectural Information Systems Laboratory,   Oct/2002 - Mar/2003
      Department of Architecture and Architectural Systems,
      Kyoto University, Kyoto, Japan

RESEARCH INTERESTS

Nonsmooth mechanics and optimization. Optimization methods for applied mechanics in engineering, including structural optimization, contact mechanics, plasticity, tension structures, masonry structures, bi-modulus structures, structural design under uncertainties, *etc*.

EDUCATION

▸ **Dr. Eng.**, Kyoto University, Kyoto, Japan   Sep/2002
Dissertation: *"Energy principles of structures based on mathematical programming over symmetric cones"*
Supervisors: Makoto Ohsaki, Naoki Katoh, and Koji Uetani

▸ **M. Eng.**, Kyoto University, Kyoto, Japan   Mar/2000
Supervisor: Makoto Ohsaki

▸ **B. Eng.**, Kyoto University, Kyoto, Japan   Mar/1998
Supervisor: Koji Uetani

AWARDS AND HONORS

▸ **Outstanding Achievement Award**   Sep/2023
The Outstanding Achievement Award in 2023 of Design and Systems Division, the Japan Society of Mechanical Engineers.

▶ **The 13th Best JORSJ/TORSJ Paper Award**   Sep/2023
The Best JORSJ/TORSJ Paper Award in 2023 of the Operations Research Society of Japan
    for "Primal-dual algorithm for quasi-static contact problem with Coulomb's frictiond" (Y. Kanno).

▶ **Good Practice for Teaching Online and/or Hybrid Courses**   Mar/2021
The President of the University of Tokyo.

▶ **Best Presentation Award of Design and Systems Division**   Nov/2020
The Best Presentation Award in 2020 of Design and Systems Division,
the Japan Society of Mechanical Engineers
    for "Topology optimization of structures with frictionless contact" (Y. Kanno).

▶ **JJIAM Best Paper Award**   Sep/2019
The JJIAM Best Paper Award in 2019 of the Japan Society for Industrial and Applied Mathematics
    for "Accelerated proximal gradient method for elastoplastic analysis
    with von Mises yield criterion" (W. Shimizu, Y. Kanno).

▶ **Encouragement Prize**   Sep/2018
The Encouragement Prize in 2018 of the Architectural Institute of Japan
    for "Global optimization of trusses with constraints on number of different cross-sections:
    a mixed-integer second-order cone programming approach" (Y. Kanno, *Comput. Optim. Appl.*,
    63, pp. 203–236, 2016).

▶ **Best Teaching Award**   Oct/2014
The 2014 Best Teaching Award of the Faculty of Engineering, The University of Tokyo.

▶ **JJIAM Best Paper Award**   Aug/2012
The JJIAM Best Paper Award in 2012 of the Japan Society for Industrial and Applied Mathematics
    for "A numerical algorithm for block-diagonal decomposition of matrix $*$-algebras with application
    to semidefinite programming" (K. Murota, Y. Kanno, M. Kojima, S. Kojima).

▶ **CJK-OSM Award for Young Investigator**   Nov/2006
The 4th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM4).

▶ **The Maeda Prize in Engineering**   Jun/2005
The Maeda Engineering Foundation.

▶ **Honor Prize (Master Thesis)**   Jun/1999
Department of Architecture and Architectural Systems, Kyoto University, Kyoto, Japan.

PUBLICATIONS

▶ **Books**

[3] **Y. Kanno**:
"*Introduction to Optimization Methods* (in Japanese)."
    Kodansha, Tokyo (2019). 236 pp. (& xiv pp.).

[2] **Y. Kanno**, T. Tsuchiya:
"*Optimization and Variational Methods* (in Japanese)."
    Maruzen Publishing, Tokyo (2014). 290 pp. (& xii pp.).

[1] **Y. Kanno**:
"*Nonsmooth Mechanics and Convex Optimization*."
    CRC Press, Boca Raton (2011). 425 pp. (& xx pp.).

▶ **Journal Articles**

[100] **Y. Kanno**, I. Takewaki: "Optimization-based approaches to uncertainty analysis of structures using non-probabilistic modeling: a review." *Computer Modeling in Engineering and Sciences*, **143**, 115–152 (2025).

[99] T. Asanuma, **Y. Kanno**: "Multi-objective surrogate optimization of mixed-variable IPM motor design problem with ADMM-based approach." *Optimization and Engineering*, to appear.

[98] A. Nishioka, M. Toyoda, M. Tanaka, **Y. Kanno**: "On a minimization problem of the maximum generalized eigenvalue: properties and algorithms." *Computational Optimization and Applications*, **90**, 303–336 (2025).
DOI: 10.1007/s10589-024-00621-4

[97] A. Nishioka, **Y. Kanno**: "A feasible smoothing accelerated projected gradient method for nonsmooth convex optimization." *Operations Research Letters*, **57**, 107181 (2024). 5 pp. DOI: 10.1016/j.orl.2024.107181

[96] **Y. Kanno**: "Data-driven confidence bound for structural response using segmented least squares: a mixed-integer programming approach." *Japan Journal of Industrial and Applied Mathematics*, **41**, 1501–1534 (2024).
DOI: 10.1007/s13160-024-00657-3

[95] **Y. Kanno**: "Non-parametric data-driven approach to reliability-based topology optimization of trusses under uncertainty of material constitutive law." *Journal of Advanced Mechanical Design, Systems, and Manufacturing*, **18**, 24-00223 (2024). 15 pp. DOI: 10.1299/jamdsm.2024jamdsm0064

[94] **Y. Kanno**: "Computation-with-confidence for static elasticity: data-driven approach with order statistics." *Zeitschrift für Angewandte Mathematik und Mechanik*, **103**, e202100482 (2023). 18 pp.
DOI: 10.1002/zamm.202100482

[93] **Y. Kanno**: "Quasi-static frictional contact analysis free from solutions of linear equations: an approach based on primal-dual algorithm." *JSIAM Letters*, **15**, 49–52 (2023). DOI: 10.14495/jsiaml.15.49

[92] Z. Zhang, **Y. Kanno**, R. Feng: "Collapse-resistance optimization of fabricated single-layer grid shell based on sequential approximate optimization." *Structural and Multidisciplinary Optimization*, **66**, 153 (2023). 13 pp. DOI: 10.1007/s00158-023-03604-x

[91] A. Nishioka, **Y. Kanno**: "Smoothing inertial method for worst-case robust topology optimization under load uncertainty." *Structural and Multidisciplinary Optimization*, **66**, 82 (2023). 29 pp.
DOI: 10.1007/s00158-023-03543-7

[90] A. Nishioka, **Y. Kanno**: "Inertial projected gradient method for large-scale topology optimization." *Japan Journal of Industrial and Applied Mathematics*, **40**, 877–905 (2023). DOI: 10.1007/s13160-023-00563-0

[89] **Y. Kanno**: "Accelerated proximal gradient method for bi-modulus static elasticity." *Optimization and Engineering*, **23**, 453–477 (2022). DOI: 10.1007/s11081-021-09595-2
Correction. **25**, 1145 (2024). DOI: 10.1007/s11081-023-09816-w

[88] **Y. Kanno**: "Primal-dual algorithm for quasi-static contact problem with Coulomb's friction." *Journal of the Operations Research Society of Japan*, **65**, 1–22 (2022). DOI: 10.15807/jorsj.65.1

Awarded **the Best JORSJ/TORSJ Paper Award in 2023**.

[87] **Y. Kanno**: "Structural reliability under uncertainty in moments: distributionally-robust reliability-based design optimization." *Japan Journal of Industrial and Applied Mathematics*, **39**, 195–226 (2022).
DOI: 10.1007/s13160-021-00483-x

[86] **Y. Kanno**: "Alternating minimization for data-driven computational elasticity from experimental data: kernel method for learning constitutive manifold." *Theoretical and Applied Mechanics Letters*, **11**, 100289 (2021). 6 pp. DOI: 10.1016/j.taml.2021.100289

[85] A. Nishioka, **Y. Kanno**: "Accelerated projected gradient method with adaptive step size for compliance minimization problem." *JSIAM Letters*, **13**, 33–36 (2021). DOI: 10.14495/jsiaml.13.33

[84] **Y. Kanno**: "A kernel method for learning constitutive relation in data-driven computational elasticity." *Japan Journal of Industrial and Applied Mathematics*, **38**, 39–77 (2021). DOI: 10.1007/s13160-020-00423-1

[83] **Y. Kanno**: "Robust optimization of structures subjected to frictionless unilateral contact with uncertain initial gaps." *Mechanical Engineering Letters*, **6**, 20-00224 (2020). 8 pp. DOI: 10.1299/mel.20-00224

[82] **Y. Kanno**: "A note on a family of proximal gradient methods for quasi-static incremental problems in elastoplastic analysis." *Theoretical and Applied Mechanics Letters*, **10**, 315–320 (2020).
DOI: 10.1016/j.taml.2020.01.044

[81] S. Fukasawa, **Y. Kanno**: "Numerical simulation of base-isolated buildings in collisions with surrounding moat walls during earthquakes: a nonsmooth mechanics approach." *Optimization and Engineering*, **21**, 1423–1457 (2020). DOI: 10.1007/s11081-019-09481-y

[80] **Y. Kanno**: "An accelerated Uzawa method for application to frictionless contact problem." *Optimization Letters*, **14**, 1845–1854 (2020). DOI: 10.1007/s11590-019-01481-2

[79] W. Shimizu, **Y. Kanno**: "A note on accelerated proximal gradient method for elastoplastic analysis with Tresca yield criterion." *Journal of the Operations Research Society of Japan*, **63**, 78–92 (2020). DOI: 10.15807/jorsj.63.78

[78] **Y. Kanno**: "On three concepts in robust design optimization: absolute robustness, relative robustness, and less variance." *Structural and Multidisciplinary Optimization*, **62**, 979–1000 (2020). DOI: 10.1007/s00158-020-02503-9

[77] **Y. Kanno**: "Dimensionality reduction enhances data-driven reliability-based design optimizer." *Journal of Advanced Mechanical Design, Systems, and Manufacturing*, **14**, 19-00200 (2020). 12 pp. DOI: 10.1299/jamdsm.2020jamdsm0008

[76] **Y. Kanno**: "Exploiting Lagrange duality for topology optimization with frictionless unilateral contact." *Japan Journal of Industrial and Applied Mathematics*, **37**, 25–48 (2020). DOI: 10.1007/s13160-019-00375-1

[75] **Y. Kanno**, M. Puvača, Z. Tomljanović, N. Truhar: "Optimization of damping positions in a mechanical system." *Rad HAZU, Matematičke Znanosti*, **23**, 141–157 (2019). DOI: 10.21857/y26kec33q9

[74] **Y. Kanno**: "Mixed-integer programming formulation of a data-driven solver in computational elasticity." *Optimization Letters*, **13**, 1505–1514 (2019). DOI: 10.1007/s11590-019-01409-w

[73] **Y. Kanno**: "A data-driven approach to non-parametric reliability-based design optimization of structures with uncertain load." *Structural and Multidisciplinary Optimization*, **60**, 83–97 (2019). DOI: 10.1007/s00158-019-02199-6

[72] **Y. Kanno**: "Intrinsic formulation and Lagrange duality for elastic cable networks with geometrical non-linearity." *Journal of Elasticity*, **134**, 193–217 (2019). DOI: 10.1007/s10659-018-9687-0

[71] K. Yonekura, **Y. Kanno**: "A heuristic method using Hessian matrix for fast flow topology optimization." *Journal of Optimization Theory and Applications*, **180**, 671–681 (2019). DOI: 10.1007/s10957-018-1404-4

[70] S. Kitayama, K. Tamada, **Y. Kanno**: "Nonlinear prediction using radial basis function network incorporating coordinate transformation." *Mechanical Engineering Letters*, **5**, 18-00517 (2019). 8 pp. DOI: 10.1299/mel.18-00517

[69] R. Watada, M. Ohsaki, **Y. Kanno**: "Group theoretic approach to large-deformation property of three-dimensional bar-hinge mechanism." *Japan Journal of Industrial and Applied Mathematics*, **36**, 177–208 (2019). DOI: 10.1007/s13160-018-0336-6

[68] **Y. Kanno**: "Alternating direction method of multipliers as simple heuristic for topology optimization of a truss with uniformed member cross-sections." *Journal of Mechanical Design*, **141**, 011403 (2019). 9 pp. DOI: 10.1115/1.4041174

[67] **Y. Kanno**: "Data-driven computing in elasticity via kernel regression." *Theoretical and Applied Mechanics Letters*, **8**, 361–365 (2018). DOI: 10.1016/j.taml.2018.06.004

[66] **Y. Kanno**: "Simple heuristic for data-driven computational elasticity with material data involving noise and outliers: a local robust regression approach." *Japan Journal of Industrial and Applied Mathematics*, **35**, 1085–1101 (2018). DOI: 10.1007/s13160-018-0323-y

[65] **Y. Kanno**: "Robust truss topology optimization via semidefinite programming with complementarity constraints: a difference-of-convex programming approach." *Computational Optimization and Applications*, **71**, 403–433 (2018). DOI: 10.1007/s10589-018-0013-3

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[64] M. Ohsaki, **Y. Kanno**, Y. Yamaoka: "Second-order cone programming approach to design of linkage mechanisms with arbitrarily inclined hinges." *Journal of Mechanical Design*, **140**, 102301 (2018). 9 pp.
DOI: 10.1115/1.4040879

[63] **Y. Kanno**, S. Kitayama: "Alternating direction method of multipliers as a simple effective heuristic for mixed-integer nonlinear optimization." *Structural and Multidisciplinary Optimization*, **58**, 1291–1295 (2018).
DOI: 10.1007/s00158-018-1946-y

[62] **Y. Kanno**, S. Fujita: "Alternating direction method of multipliers for truss topology optimization with limited number of nodes: a cardinality-constrained second-order cone programming approach." *Optimization and Engineering*, **19**, 327–358 (2018).
DOI: 10.1007/s11081-017-9372-3

[61] W. Shimizu, **Y. Kanno**: "Accelerated proximal gradient method for elastoplastic analysis with von Mises yield criterion." *Japan Journal of Industrial and Applied Mathematics*, **35**, 1–32 (2018).
DOI: 10.1007/s13160-017-0280-x

Awarded **the JJIAM Best Paper Award in 2019**.

[60] **Y. Kanno**, S. Fujita, Y. Ben-Haim: "Structural design for earthquake resilience: info-gap management of uncertainty." *Structural Safety*, **69**, 23–33 (2017).
DOI: 10.1016/j.strusafe.2017.07.004

[59] K. Yonekura, **Y. Kanno**: "Topology optimization method for interior flow based on transient information of the lattice Boltzmann method with a level-set function." *Japan Journal of Industrial and Applied Mathematics*, **34**, 611–632 (2017).
DOI: 10.1007/s13160-017-0257-9

[58] **Y. Kanno**, H. Yamada: "A note on truss topology optimization under self-weight load: mixed-integer second-order cone programming approach." *Structural and Multidisciplinary Optimization*, **56**, 221–226 (2017).
DOI: 10.1007/s00158-017-1657-9

[57] K. Fujita, K. Yasuda, **Y. Kanno**, I. Takewaki: "Robustness evaluation of elastic-plastic base-isolated high-rise buildings under critical double impulse." *Frontiers in Built Environment (Specialty Section: Earthquake Engineering)*, **3**, 31 (2017). 13 pp.
DOI: 10.3389/fbuil.2017.00031

[56] **Y. Kanno**, K. Yasuda, K. Fujita, I. Takewaki: "Robustness of SDOF elastoplastic structure subjected to double-impulse input under simultaneous uncertainties of yield deformation and stiffness." *International Journal of Non-Linear Mechanics*, **91**, 151–162 (2017).
DOI: 10.1016/j.ijnonlinmec.2017.02.013

[55] **Y. Kanno**: "Redundancy optimization of finite-dimensional structures: concept and derivative-free algorithm." *Journal of Structural Engineering*, **143**, 04016151 (2017). 10 pp.
DOI: 10.1061/(ASCE)ST.1943-541X.0001630

[54] **Y. Kanno**: "A fast first-order optimization approach to elastoplastic analysis of skeletal structures." *Optimization and Engineering*, **17**, 861–896 (2016).
DOI: 10.1007/s11081-016-9326-1

[53] T. Yamaguchi, **Y. Kanno**: "Ellipsoidal load-domain shakedown analysis with von Mises yield criterion: a robust optimization approach." *International Journal for Numerical Methods in Engineering*, **107**, 1136–1144 (2016).
DOI: 10.1002/nme.5206

[52] **Y. Kanno**, I. Takewaki: "Robustness analysis of elastoplastic structure subjected to double impulse." *Journal of Sound and Vibration*, **383**, 309–323 (2016).
DOI: 10.1016/j.jsv.2016.07.023

[51] **Y. Kanno**: "Mixed-integer second-order cone programming for global optimization of compliance of frame structure with discrete design variables." *Structural and Multidisciplinary Optimization*, **54**, 301–316 (2016).
DOI: 10.1007/s00158-016-1406-5

[50] **Y. Kanno**: "A note on formulations of static shakedown analysis with bounded kinematic hardening." *Mechanics Research Communications*, **74**, 57–59 (2016).
DOI: 10.1016/j.mechrescom.2016.04.005

[49] S. Yamada, **Y. Kanno**: "Relaxation approach to topology optimization of frame structure under frequency constraint." *Structural and Multidisciplinary Optimization*, **53**, 731–744 (2016).
DOI: 10.1007/s00158-015-1353-6

[48] **Y. Kanno**: "Global optimization of trusses with constraints on number of different cross-sections: a mixed-integer second-order cone programming approach." *Computational Optimization and Applications*, **63**, 203–236 (2016).   DOI: 10.1007/s10589-015-9766-0

Awarded **the Encouragement Prize of AIJ 2018**.

[47] M. Hirota, **Y. Kanno**: "Optimal design of periodic frame structures with negative thermal expansion via mixed integer programming." *Optimization and Engineering*, **16**, 767–809 (2015).
DOI: 10.1007/s11081-015-9276-z

[46] D. Hashimoto, **Y. Kanno**: "A semidefinite programming approach to robust truss topology optimization under uncertainty in locations of nodes." *Structural and Multidisciplinary Optimization*, **51**, 439–461 (2015).   DOI: 10.1007/s00158-014-1146-3

[45] K. Yonekura, **Y. Kanno**: "A flow topology optimization method for steady state flow using transient information of flow field solved by lattice Boltzmann method." *Structural and Multidisciplinary Optimization*, **51**, 159–172 (2015).   DOI: 10.1007/s00158-014-1123-x
Erratum. **54**, 193–195 (2016).   DOI: 10.1007/s00158-016-1472-8

[44] M. Ohsaki, **Y. Kanno**, S. Tsuda: "Linear programming approach to design of spatial link mechanism with partially rigid joints." *Structural and Multidisciplinary Optimization*, **50**, 945–956 (2014).
DOI: 10.1007/s00158-014-1094-y

[43] R. Kureta, **Y. Kanno**: "A mixed integer programming approach to designing periodic frame structures with negative Poisson's ratio." *Optimization and Engineering*, **15**, 773–800 (2014).
DOI: 10.1007/s11081-013-9225-7

[42] **Y. Kanno**: "Worst-case load in plastic limit analysis of frame structures." *Journal of Mechanics of Materials and Structures*, **8**, 415–439 (2013).   DOI: 10.2140/jomms.2013.8.415

[41] **Y. Kanno**: "Damper placement optimization in a shear building model with discrete design variables: a mixed-integer second-order cone programming approach." *Earthquake Engineering and Structural Dynamics*, **42**, 1657–1676 (2013).   DOI: 10.1002/eqe.2292

[40] **Y. Kanno**: "Exploring new tensegrity structures via mixed integer programming." *Structural and Multidisciplinary Optimization*, **48**, 95–114 (2013).   DOI: 10.1007/s00158-012-0881-6

[39] **Y. Kanno**: "Topology optimization of tensegrity structures under compliance constraint: a mixed integer linear programming approach." *Optimization and Engineering*, **14**, 61–96 (2013).
DOI: 10.1007/s11081-011-9172-0

[38] **Y. Kanno**: "Topology optimization of tensegrity structures under self-weight loads." *Journal of the Operations Research Society of Japan*, **55**, 125–145 (2012).   DOI: 10.15807/jorsj.55.125

[37] **Y. Kanno**: "Worst scenario detection in limit analysis of trusses against deficiency of structural components." *Engineering Structures*, **42**, 33–42 (2012).   DOI: 10.1016/j.engstruct.2012.04.012

[36] K. Yonekura, **Y. Kanno**: "Second-order cone programming with warm start for elastoplastic analysis with von Mises yield criterion." *Optimization and Engineering*, **13**, 181–218 (2012).
DOI: 10.1007/s11081-011-9144-4

[35] **Y. Kanno**, Y. Ben-Haim: "Redundancy and robustness, or, when is redundancy redundant?" *Journal of Structural Engineering (Special Issue: Commemorating 10 Years of Research since 9/11)*, **137**, 935–945 (2011).   DOI: 10.1061/(ASCE)ST.1943-541X.0000416

[34] **Y. Kanno**: "An implicit formulation of mathematical program with complementarity constraints for application to robust structural optimization." *Journal of the Operations Research Society of Japan*, **54**, 65–85 (2011).   DOI: 10.15807/jorsj.54.65

[33] R. Watada, M. Ohsaki, **Y. Kanno**: "Non-uniqueness and symmetry of optimal topology of a shell for minimum compliance." *Structural and Multidisciplinary Optimization*, **43**, 459–471 (2011).
DOI: 10.1007/s00158-010-0587-6

[32] **Y. Kanno**, M. Ohsaki: "A non-interior implicit smoothing approach to complementarity problems for frictionless contacts." *Computer Methods in Applied Mechanics and Engineering*, **200**, 1176–1185 (2011).

DOI: 10.1016/j.cma.2010.06.038

[31] K. Yonekura, **Y. Kanno**: "Global optimization of robust truss topology via mixed integer semidefinite programming." *Optimization and Engineering*, **11**, 355–379 (2010). DOI: 10.1007/s11081-010-9107-1

[30] **Y. Kanno**, X. Guo: "A mixed integer programming for robust truss topology optimization with stress constraints." *International Journal for Numerical Methods in Engineering*, **83**, 1675–1699 (2010).

DOI: 10.1002/nme.2871

[29] R. Fujita, **Y. Kanno**: "Enumeration of all wedged equilibrium configurations in contact problem with Coulomb friction." *Computer Methods in Applied Mechanics and Engineering*, **199**, 1202–1215 (2010).

DOI: 10.1016/j.cma.2009.12.008

[28] S. Ehara, **Y. Kanno**: "Topology design of tensegrity structures via mixed integer programming." *International Journal of Solids and Structures*, **47**, 571–579 (2010). DOI: 10.1016/j.ijsolstr.2009.10.020

[27] K. Murota, **Y. Kanno**, M. Kojima, S. Kojima: "A numerical algorithm for block-diagonal decomposition of matrix $*$-algebras with application to semidefinite programming." *Japan Journal of Industrial and Applied Mathematics*, **27**, 125–160 (2010). DOI: 10.1007/s13160-010-0006-9

Awarded **the JJIAM Best Paper Award in 2012**.

[26] T. Miyamura, **Y. Kanno**, M. Ohsaki: "Combined interior-point method and semismooth Newton method for frictionless contact problems." *International Journal for Numerical Methods in Engineering*, **81**, 707–727 (2010). DOI: 10.1002/nme.2707

[25] **Y. Kanno**, I. Takewaki: "Semidefinite programming for dynamic steady-state analysis of structures under uncertain harmonic loads." *Computer Methods in Applied Mechanics and Engineering*, **198**, 3239–3261 (2009). DOI: 10.1016/j.cma.2009.06.005

[24] T. Miyamura, **Y. Kanno**, M. Ohsaki: "A practical variant of the semismooth Newton method for frictionless contact problems." *Journal of Computational Science and Technology*, **3**, 54–65 (2009).

DOI: 10.1299/jcst.3.54

[23] **Y. Kanno**, M. Ohsaki: "Optimization-based stability analysis of structures under unilateral constraints." *International Journal for Numerical Methods in Engineering*, **77**, 90–125 (2009). DOI: 10.1002/nme.2401

[22] M. Ohsaki, **Y. Kanno**: "Stability analysis of cable–bar structures by inverse-power method for eigenvalue analysis with penalization." *International Journal of Solids and Structures*, **45**, 4264–4273 (2008).

DOI: 10.1016/j.ijsolstr.2008.03.006

[21] Y. Matsuda, **Y. Kanno**: "Robustness analysis of structures based on plastic limit analysis with uncertain loads." *Journal of Mechanics of Materials and Structures*, **3**, 213–242 (2008).

DOI: 10.2140/jomms.2008.3.213

[20] **Y. Kanno**, I. Takewaki: "Semidefinite programming for uncertain linear equations in static analysis of structures." Special Issue of *Computer Methods in Applied Mechanics and Engineering* on computational methods in optimization considering uncertainties, **198**, 102–115 (2008). An invited article.

DOI: 10.1016/j.cma.2008.04.003

[19] **Y. Kanno**, I. Takewaki: "Worst-case plastic limit analysis of trusses under uncertain loads via mixed 0–1 programming." *Journal of Mechanics of Materials and Structures*, **2**, 245–273 (2007).

DOI: 10.2140/jomms.2007.2.245

[18] **Y. Kanno**, I. Takewaki: "Ellipsoidal bounds for static response of framed structures against interactive uncertainties." Inaugural Issue of *Interaction and Multiscale Mechanics: An International Journal*, **1**, 103–121 (2007). An invited article. DOI: 10.12989/imm.2007.1.1.103

[17] **Y. Kanno**, J. A. C. Martins: "Arc-length method for frictional contact problems using mathematical programming with complementarity constraints." *Journal of Optimization Theory and Applications*, **131**, 89–113 (2006). DOI: 10.1007/s10957-006-9127-3

[16] **Y. Kanno**, I. Takewaki: "Sequential semidefinite program for maximum robustness design of structures under load uncertainties." *Journal of Optimization Theory and Applications*, **130**, 265–287 (2006).
DOI: 10.1007/s10957-006-9102-z

[15] **Y. Kanno**, I. Takewaki: "Confidence ellipsoids for static response of trusses with load and structural uncertainties." *Computer Methods in Applied Mechanics and Engineering*, **196**, 393–403 (2006).
DOI: 10.1016/j.cma.2006.04.007

[14] **Y. Kanno**, I. Takewaki: "Robustness analysis of trusses with separable load and structural uncertainties." *International Journal of Solids and Structures*, **43**, 2646–2669 (2006).   DOI: 10.1016/j.ijsolstr.2005.06.088

[13] T. Ariga, **Y. Kanno**, I. Takewaki: "Resonant behavior of base-isolated high-rise buildings under long-period ground motions." *The Structural Design of Tall and Special Buildings*, **15**, 325–338 (2006).
DOI: 10.1002/tal.298

[12] J. Y. Zhang, M. Ohsaki, **Y. Kanno**: "A direct approach to design of geometry and forces of tensegrity systems." *International Journal of Solids and Structures*, **43**, 2260–2278 (2006).
DOI: 10.1016/j.ijsolstr.2005.04.044

[11] **Y. Kanno**, M. Ohsaki: "Contact analysis of cable networks by using second-order cone programming." *SIAM Journal on Scientific Computing*, **27**, 2032–2052 (2006).   DOI: 10.1137/S1064827503431946

[10] **Y. Kanno**, J. A. C. Martins, A. Pinto da Costa: "Three-dimensional quasi-static frictional contact by using second-order cone linear complementarity problem." *International Journal for Numerical Methods in Engineering*, **65**, 62–83 (2006).   DOI: 10.1002/nme.1493

[9] **Y. Kanno**, M. Ohsaki: "Minimum principle of complementary energy for nonlinear elastic cable networks with geometrical nonlinearities." *Journal of Optimization Theory and Applications*, **126**, 617–641 (2005).
DOI: 10.1007/s10957-005-5500-x

[8] K. Ikeda, M. Ohsaki, **Y. Kanno**: "Imperfection sensitivity of hilltop branching points of systems with dihedral group symmetry." *International Journal of Non-Linear Mechanics*, **40**, 755–774 (2005).
DOI: 10.1016/j.ijnonlinmec.2004.10.001

[7] **Y. Kanno**, M. Ohsaki: "Minimum principle of complementary energy of cable networks by using second-order cone programming." *International Journal of Solids and Structures*, **40**, 4437–4460 (2003).
DOI: 10.1016/S0020-7683(03)00215-4

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[5] **Y. Kanno**, M. Ohsaki, N. Katoh: "Symmetricity of the solution of semidefinite program." *Structural and Multidisciplinary Optimization*, **24**, 225–232 (2002).   DOI: 10.1007/s00158-002-0232-0

[4] **Y. Kanno**, M. Ohsaki, K. Murota, N. Katoh: "Group symmetry in interior-point methods for semidefinite program." *Optimization and Engineering*, **2**, 293–320 (2001).   DOI: 10.1023/A:1015366416311

[3] **Y. Kanno**, M. Ohsaki, N. Katoh: "Sequential semidefinite programming for optimization of framed structures under multimodal buckling constraints." *International Journal of Structural Stability and Dynamics*, **1**, 585–602 (2001).   DOI: 10.1142/S0219455401000305

[2] **Y. Kanno**, M. Ohsaki: "Necessary and sufficient conditions for global optimality of eigenvalue optimization problems." *Structural and Multidisciplinary Optimization*, **22**, 248–252 (2001).
DOI: 10.1007/s001580100142

[1] M. Ohsaki, K. Fujisawa, N. Katoh, **Y. Kanno**: "Semi-definite programming for topology optimization of trusses under multiple eigenvalue constraints." *Computer Methods in Applied Mechanics and Engineering*, **180**, 203–217 (1999).   DOI: 10.1016/S0045-7825(99)00056-0

▶ **Articles in JSME Domestic Journals**

[2] S. Fujita, **Y. Kanno**: "Simultaneous optimization of shape, thickness and topology of shell structures using sigmoid functio (in Japanese)." *Transactions of the Japan Society of Mechanical Engineers (JSME)*, **85** (**No. 872**), 18-00160 (2019).   DOI: 10.1299/transjsme.18-00160

[1] K. Yonekura, **Y. Kanno**: "Fast local convergence for flow topology optimization using the lattice Boltzmann method with a modified Newton method (in Japanese)." *Transactions of the Japan Society of Mechanical Engineers (JSME)*, **82** (**No. 833**), 15-00337 (2016).   DOI: 10.1299/transjsme.15-00337

▶ **Articles in AIJ Domestic Journals**

[9] S. Fujita, **Y. Kanno**: "Application of accelerated gradient method to equilibrium analysis of trusses with nonlinear elastic materials (in Japanese)." *Journal of Structural and Construction Engineering (Transactions of AIJ)*, **84** (**No. 763**), 1223–1230 (2019).   DOI: 10.3130/aijs.84.1223

[8] S. Fujita, **Y. Kanno**: "Global topology optimization of structural frames with upper bounds for member lengths and number of joints: a mixed-integer second-order cone programming approach (in Japanese)." *Journal of Structural and Construction Engineering (Transactions of AIJ)*, **83** (**No. 745**), 451–458 (2018).   DOI: 10.3130/aijs.83.451

[7] S. Fujita, **Y. Kanno**, M. Ohsaki: "Computational morphogenesis of minimal surface represented as parametric surface (in Japanese)." *Journal of Structural and Construction Engineering (Transactions of AIJ)*, **82** (**No. 738**), 1299–1307 (2017).   DOI: 10.3130/aijs.82.1299

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[5] **Y. Kanno**: "A note on formulations of robust compliance optimization under uncertain loads (in English)." *Journal of Structural and Construction Engineering (Transactions of AIJ)*, **80** (**No. 710**), 601–607 (2015).   DOI: 10.3130/aijs.80.601

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[3] **Y. Kanno**: "Robustness analysis of structures under compliance constraint (in Japanese)." *Journal of Structural and Construction Engineering (Transactions of AIJ)*, **77** (**No. 671**), 27–33 (2012).   DOI: 10.3130/aijs.77.27

[2] **Y. Kanno**, I. Takewaki: "Approximation algorithm for robustness functions of trusses with uncertain stiffness under uncertain forces (in Japanese)." *Journal of Structural and Construction Engineering (Transactions of AIJ)*, **No. 591**, 53–60 (2005).   DOI: 10.3130/aijs.70.53_2

[1] **Y. Kanno**, M. Ohsaki, K. Fujisawa, N. Katoh: "Topology optimization of trusses for specified multiple linear buckling load factors by using semidefinite programming (in Japanese)." *Journal of Structural and Construction Engineering (Transactions of AIJ)*, **No. 541**, 113–119 (2001).   DOI: 10.3130/aijs.66.113_1

▶ **Contributions to Book Chapters**

[8] **Y. Kanno**: "Chapter 3: Introduction to optimization and optimal design (in Japanese)." Architectural Institute of Japan (ed.), *Recent Advances and Applications of Structural Optimization in Architectural Engineering Design*, pp. 24–42, Architectural Institute of Japan, Tokyo (2020).

[7] **Y. Kanno**: "Chapter 8: Contact problems (in Japanese)." Architectural Institute of Japan (ed.), *Challenge with Numerical Analyses for Strong Nonlinear Problems in Building Structures*, pp. 241–264, Architectural Institute of Japan, Tokyo (2018).

[6] 大崎 純，**寒野 善博**：トラス構造の最適設計．日本応用数理学会（監修），薩摩 順吉，大石 進一，杉原 正顯（編集）『応用数理ハンドブック』，pp. 534–537, 朝倉書店 (2013).

[5] **Y. Kanno**: "Chapter 4: Evaluation of robustness and redundancy (in Japanese)." Architectural Institute of Japan (ed.), *Redundancy and Robustness in Building Structural Design*, pp. 43–58, Architectural Institute of Japan, Tokyo (2013).

[4] 寒野 善博：半正定値計画問題，2 次錐計画問題．茨木 俊秀，片山 徹，藤重 悟（監修），太田 快人，酒井 英昭，高橋 豊，田中 利幸，永持 仁，福島 雅夫（編集），『数理工学事典』, pp. 511–517, 朝倉書店 (2011).

[3] **Y. Kanno**, I. Takewaki: "Dynamic steady-state analysis of structures under uncertain harmonic loads via semidefinite program." A. K. Belyaev, R. S. Langley (eds.), *IUTAM Symposium on the Vibration Analysis of Structures with Uncertainties*, pp. 99–112, Springer, Dordrecht (2011).   DOI: 10.1007/978-94-007-0289-9_8

[2] **Y. Kanno**, I. Takewaki: "Chapter 17: Maximum robustness design of trusses via semidefinite programming." Y. Tsompanakis, N. D. Lagaros, M. Papadrakakis (eds.), *Structural Design Optimization Considering Uncertainties*, pp. 471–498, Taylor & Francis, Leiden (2008).

[1] M. Ohsaki, **Y. Kanno**: "Chapter 21: Semidefinite programming for structural optimization." J. S. Arora (ed.), *Optimization of Structural and Mechanical Systems*, pp. 541–567, World Scientific Publishing, Singapore (2007).

▶ **Expository Articles**

[11] 寒野 善博：応用力学における加速勾配法．第 36 回 RAMP シンポジウム（日本オペレーションズ・リサーチ学会），pp. 47–62 (2024).

[10] 寒野 善博：構造物の最適設計における非線形最適化．オペレーションズ・リサーチ, **68**, 636–642 (2023).

[9] 寒野 善博：建築構造物の釣合い解析に対するデータ駆動型の手法の動向．2022 年度日本建築学会大会（北海道）・情報システム技術部門 研究協議会資料『建築と情報—これからの建築学に向けて』, pp. 42–45 (2022).

[8] 寒野 善博：構造最適化．『数理科学』, **No. 677** (November Issue), pp. 21–27, サイエンス社 (2019).

[7] 寒野 善博：データ科学を支える最適化の動向．2019 年度日本建築学会大会（北陸）・構造部門（応用力学）パネルディスカッション資料『最適化・AI 手法で構造設計は変わるのか？』, pp. 10–16 (2019).

[6] 寒野 善博：ロバスト性・冗長性とレジリエンス．2016 年度日本建築学会大会（九州）・構造部門（応用力学）パネルディスカッション資料『レジリエントで高い安全性を確保する構造設計とは』, pp. 13–19 (2016).

[5] 寒野 善博：混合整数 2 次錐計画を用いたトラス構造の最適設計法．第 27 回 RAMP シンポジウム（日本オペレーションズ・リサーチ学会），pp. 157–170 (2015).

[4] 寒野 善博：2 次錐計画の構造力学への応用．オペレーションズ・リサーチ, **59**, 725–731 (2014).

[3] 寒野 善博：構造物のロバスト最適化．日本オペレーションズ・リサーチ学会・第 66 回シンポジウム・資料『モノづくりに活かされる知能化・最適化』, pp. 25–34 (2011).

[2] 寒野 善博：ロバスト性を考慮した設計．2008 年度日本建築学会大会（中国）・構造部門（応用力学）パネルディスカッション資料『建築構造設計における冗長性と頑強性の役割—リダンダンシーとロバスト性とは—』, pp. 14–23 (2008).

[1] 寒野 善博，竹脇 出：半正定値計画法を用いた構造物の不確定性解析．第 19 回 RAMP シンポジウム（日本オペレーションズ・リサーチ学会），pp. 193–207 (2007).

▶ **Dissertation**

▶ *Energy Principles of Structures based on Mathematical Programming over Symmetric Cones (in Japanese)*, June 2002, Kyoto University, Japan.

GUEST APPOINTMENTS

▶ Visiting Professor, Department of Engineering Mechanics, Dalian University of Technology, China.

Nov/2014 - Dec/2014

GRANTS

▶ Principal investigator (1 of 1), Grant-in-Aid for Scientific Research (C),   Apr/2024 - Mar/2027
  Grants-in-Aid for Scientific Research,
  Japan Society for the Promotion of Science, ¥3,600,000,
  "New development of reliability-based topology optimization: Methods based on duality theory and accelerated optimization methods."

▶ Principal investigator (1 of 1), Grant-in-Aid for Scientific Research (C),   Apr/2021 - Mar/2024
  Grants-in-Aid for Scientific Research,
  Japan Society for the Promotion of Science, ¥3,200,000,
  "New development of topology optimization methods against nonlinear responses: Methodologies centering on statistical inference and accelerated optimization methods."

▶ Principal investigator (1 of 1), **Research Grants**,   Apr/2021 - Mar/2022
  The Maeda Engineering Foundation, ¥1,000,000,
  "Development of super-robust optimization methodology for designing high-resilient structures."

▶ Principal investigator (1 of 1), **Research Grants**,   Apr/2021 - Mar/2022
  The Kajima Foundation, ¥850,000,
  "Development of data-driven approach to structural optimization."

▶ Principal investigator (1 of 1), **Research Grants**,   Apr/2020 - Mar/2021
  The Obayashi Foundation, ¥1,000,000,
  "Development of fundamental techniques for data-driven structural engineering."

▶ Principal investigator (1 of 1), **Research Grants**,   Apr/2019 - Mar/2020
  The Maeda Engineering Foundation, ¥1,000,000,
  "Initiation of data-driven approach to reliability-based design optimization."

▶ Investigator (1 of 3), Grant-in-Aid for Challenging Research (Exploratory),   Apr/2018 - Mar/2020
  Grants-in-Aid for Scientific Research,
  Japan Society for the Promotion of Science, ¥4,600,000,
  "Feature analysis and optimization of higher-ranking designs of steel structures via machine learning and reinforced learning."
  Principal investigator: Makoto Ohsaki.

▶ Principal investigator (1 of 1), Grant-in-Aid for Scientific Research (C),   Apr/2017 - Mar/2020
  Grants-in-Aid for Scientific Research,
  Japan Society for the Promotion of Science, ¥3,600,000,
  "Acceleration of the numerical solutions of structural optimization: Development of optimization methods for large-scale structures."

▶ Principal investigator (1 of 1), **Research Grants**,   Apr/2016 - Mar/2017
  The Obayashi Foundation, ¥600,000,
  "Development of optimization approach to structural design with redundancy requirements."

▶ Investigator (1 of 3), Grant-in-Aid for Scientific Research (C),   Apr/2015 - Mar/2018
  Grants-in-Aid for Scientific Research,
  Japan Society for the Promotion of Science, ¥3,700,000,
  "Combinatorial characterization of stability of tensegrity structures."
  Principal investigator: Jingyao Zhang.

▶ Principal investigator (1 of 1), Grant-in-Aid for Scientific Research (C),   Apr/2014 - Mar/2017
  Grants-in-Aid for Scientific Research,
  Japan Society for the Promotion of Science, ¥3,800,000,
  "Robust design of structures considering nonlinear responses from the perspective of duality principle."

▶ Principal investigator (1 of 1), Grant-in-Aid for Scientific Research (C),   Apr/2011 - Mar/2014
  Grants-in-Aid for Scientific Research,
  Japan Society for the Promotion of Science, ¥4,000,000,
  "Development of nonsmooth mechanics approach to analysis and design of strongly nonlinear structures."

▶ Principal investigator (1 of 1), Young Scientists (B),   Apr/2008 - Mar/2011
  Grants-in-Aid for Scientific Research,
  Ministry of Education, Culture, Sports, Science and Technology of Japan, ¥3,300,000,
  "Paradigm development for robust structural design based on non-probabilistic uncertainty modeling."

► Principal investigator (1 of 1), **Research Grants**,   Apr/2006 - Mar/2007
  The Inamori Foundation, ¥1,000,000,
    *"Bifurcation in equations over symmetric cones and mechanical systems
    with unilateral constraints."*

► Principal investigator (1 of 1), Young Scientists (B),   Apr/2005 - Mar/2008
  Grants-in-Aid for Scientific Research,
  Ministry of Education, Culture, Sports, Science and Technology of Japan, ¥3,400,000,
    *"Nonlinear analysis of structures with energy dissipation and contact conditions
    based on conic complementarity problems."*

► Principal investigator (1 of 1), **Kurata Grants**,   Apr/2005 - Mar/2007
  The Kurata Memorial Hitachi Science and Technology Foundation, ¥1,500,000,
    "Wrinkling analysis of membranes based on the energy principles over symmetric cones."

SOCIAL ACTIVITIES

► **Open Lectures**

[9] **Y. Kanno**: 数理・データサイエンス・AI モデルカリキュラム準拠の教材について. 数理・データサイエンス・AI 教育強化拠点コンソーシアム『2024 年度 関東ブロック対面ワークショップ』, Tokyo, October 7, 2024.

[8] **Y. Kanno**: "Optimal design via convex programming and integer programming (in Japanese)." JSME Open Lecture, No. 23-108, *Mathematical Foundation of Optimal Design Methods*, Japan Society of Mechanical Engineers, Nagoya, Japan, December 13–14, 2023.

[7] Y. Yokosuka, **Y. Kanno**: 構造生成・最適化ハンズオン.『情報ワークショップ』, Architectural Institute of Japan, Kyoto, September 12, 2023.

[6] **Y. Kanno**: 模擬講義：データサイエンス基礎.『応用基礎レベル教材と模擬講義』（数理・データサイエンス教育強化拠点コンソーシアム，関東・首都圏ワークショップ）, Online (Tokyo), June 24, 2021.

[5] **Y. Kanno**: 数理・データサイエンス・AI リテラシーレベルの教材について.『モデルカリキュラムと実装』（数理・データサイエンス教育強化拠点コンソーシアム，関東・首都圏ワークショップ）, Tokyo, August 5, 2020.

[4] **Y. Kanno**: "Variational methods and duality (in Japanese)." JSME Open Lecture, No. 19-341, *Mathematics of Optimal Design Methods*, Japan Society of Mechanical Engineers, Tokyo, Japan, November 18, 2019.

[3] **Y. Kanno**: コンソーシアムの取組紹介：教材分科会.『データサイエンス教育の普及と展開』（数理・データサイエンス教育強化拠点コンソーシアム，関東・首都圏ワークショップ）, Tokyo, August 31, 2019.

[2] **Y. Kanno**: "Robust optimal design (in Japanese)." JSME Open Lecture, No. 17-72, *Optimal Design Methods towards Practices*, Japan Society of Mechanical Engineers, Tokyo, Japan, September 11, 2017.

[1] **Y. Kanno**: "Introduction to structural optimization: Mathematical modeling of design problems (in Japanese)." *KKE Vision 2015*, Kozo Keikaku Engineering, Inc., Tokyo, Japan, October 29, 2015.

► **Teaching Recurrent Education Courses**

[5] "Optimization" ($1.5\,\mathrm{h} \times 6$).
  A part of the course in Data Science School, UTokyo Extension, Co., Ltd.

                                                           Jan/2026 - Feb/2026

                              Jul/2025, Mar/2025 - Apr2025, Jul/2024

                 Jun/2023 - Jul/2023, Apr/2023, Oct/2022 - Nov/2022

                           Feb/2022 - Mar/2022, Jan/2022 - Feb/2022

                                Jul/2021, Feb/2021 - Mar/2021, Jan/2021

[4] "Introduction to Integer Programming" ($1.5\,\mathrm{h} \times 2$).
A recurrent education course of the University of Tokyo.   June/2024 - July/2024

[3] "Introduction to Combinatorial Optimization" ($1.5\,\mathrm{h} \times 3$).
A recurrent education course of the University of Tokyo.   June/2023 - July/2023

[2] "Introduction to Combinatorial Optimization" ($1.5\,\mathrm{h} \times 3$).
A recurrent education course of the University of Tokyo.   June/2022 - July/2022

[1] "Introduction to Optimization Methods" ($1.5\,\mathrm{h} \times 4$).
A recurrent education course of the University of Tokyo.   Dec/2018

▶ **Review of Structural Design of Building Structures**

[1] Member,
Review Committee of High-rise and Seismically Base-Isolated Building Structures.
J Architecture Inspection Center, Co., Ltd.   Oct/2019 - Sep/2020

PROFESSIONAL ACTIVITIES

▶ **Member**, Local organizing committee,
The 16th World Congress of Structural and Multidisciplinary Optimization (WCSMO16), Kobe, Japan, May 18–23, 2025.

▶ **Member**, Subcommittee on design science,
Architectural Institute of Japan.   Apr/2025 - Mar/2027

▶ **Member**, Invited Experts,
International Association for Shell and Spatial Structures (IASS) Annual Symposium—Redefining the Art of Structural Design, Zurich, Switzerland, August 26–30, 2024.

▶ **Co-chair**,
Asian Congress of Structural and Multidisciplinary Optimization 2024 (ACSMO 2024), Zhengzhou, China, May 19–23, 2024.

▶ **Co-president**,
Asian Society of Structural and Multidisciplinary Optimization (ASSMO).   Jan/2024 - present

▶ **Member**, Organizing committee,
The 33rd Meeting of JSME Design and Systems Division, Kanazawa, Japan, September 19–21, 2023.

▶ **Organized a minisymposium** (with Satoshi Kitayama and Akihiro Takezawa) at *the 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023)*, Tokyo, Japan, August 20–25, 2023: "New trends in structural and engineering optimization."

▶ **Member**, Scientific Committee,
International Association for Shell and Spatial Structures (IASS) Annual Symposium—Integration of Design and Fabrication, Melbourne, Australia, July 10–14, 2023.

▶ **Member**, Subcommittee of structural optimization and total design,
Architectural Institute of Japan.   Apr/2023 - Mar/2027

▶ **Member**, Subcommittee on design science,
Architectural Institute of Japan.   Apr/2023 - Mar/2025

▶ **Member**, Organizing committee,
OPTIS 2022 (the Japan Society of Mechanical Engineers), Nagoya, Japan, November 12–13, 2022.

▶ **Organized a session** (with Kohei Fujita, Yasuyuki Nagano, Ryouichi Shibata, and Makoto Yamakawa) at *the 66th National Congress of Theoretical and Applied Mechanics*, Tokyo, Japan, June 24–26, 2022: "Advanced analysis using optimization and artificial intelligence."

▶ **Member**, Subcommittee on evaluating reliability of strong nonlinear analysis,
Architectural Institute of Japan.   Apr/2022 - Mar/2026

▶ **Vice-Chair**, Local Organizing Committee,
Member, Organizing Committee,

Asian Congress of Structural and Multidisciplinary Optimization 2022 (ACSMO 2022), Matsue (hybrid format), Japan, May 22–26, 2022.

▶ **Member**, Scientific Committee,
International Association for Shell and Spatial Structures (IASS) Annual Symposium and Spatial Structures Conference 2020/21, Surrey, UK, August 23–27, 2021.

▶ **Member**, Subcommittee of structural design with resilience,
Architectural Institute of Japan. Apr/2021 - Mar/2025

▶ **Member**, Research committee on research and development for growth-adaptive design and manufacturing methodology,
Japan Society of Mechanical Engineers. Mar/2021 - Feb/2023

▶ **Member**, Executive Council,
Asian Society of Structural and Multidisciplinary Optimization (ASSMO). Nov/2020 - present

▶ **Member**, Organizing Committee,
Asian Congress of Structural and Multidisciplinary Optimization 2020 (ACSMO 2020), Online (Seoul, Korea), November 23–25, 2020.

▶ **External reviewer**,
Postgraduate Research Scholarship (PGRS) Fund,
Xi'an Jiaotong-Liverpool University. Oct/2020 - Nov/2020

▶ **Member**, Subcommittee of structural optimization and collaboration,
Architectural Institute of Japan. Apr/2020 - Mar/2023

▶ **Member**, Technical session on surrogate modeling for analysis and design,
Japan Society of Mechanical Engineers. Oct/2019 - Sep/2024

▶ **Member**, International Papers Committee,
The 13th World Congress of Structural and Multidisciplinary Optimization (WCSMO13), Beijing, China, May 20–24, 2019.

▶ **Member**, Steering committee of computer technology of information, systems and applications,
Architectural Institute of Japan. Apr/2019 - Mar/2023

▶ **Member**, General Council,
Asian Society of Structural and Multidisciplinary Optimization (ASSMO). 2018 - Oct/2020

▶ **Member**, Organizing committee,
OPTIS 2018 (the Japan Society of Mechanical Engineers), Kyoto, Japan, October 15–16, 2018.

▶ **Member**, Steering committee of applied mechanics,
Architectural Institute of Japan. Aug/2018 - Mar/2021

▶ **Member**, Scientific committee,
Asian Congress of Structural and Multidisciplinary Optimization 2018 (ACSMO 2018), Dalian, China, May 21–24, 2018.

▶ **Executive secretary**, Subcommittee of strongly nonlinear problems,
Architectural Institute of Japan. Apr/2018 - Mar/2022

▶ **Member**, 教材分科会,
数理・データサイエンス教育強化拠点コンソーシアム Feb/2018 - Mar/2022

▶ **Member**, 実大三次元震動破壊実験施設・数値震動台データ利活用システム検討委員会,
National Research Institute for Earth Science and Disaster Resilience Sep/2017 - Oct/2023

▶ **Member**, Scientific committee,
International Association for Shell and Spatial Structures (IASS) Annual Symposium—Interfaces: Architecture, Engineering, Science, Hamburg, Germany, September 25–28, 2017.

▶ **Organized a session** (with Makoto Ohsaki) at *International Association for Shell and Spatial Structures (IASS) Annual Symposium—Interfaces: Architecture, Engineering, Science*, Hamburg, Germany, September 25–28, 2017: "Optimization approaches to analysis and design."

▶ **Organized a session** (with Toyofumi Takada and Izuru Takewaki) at *the 64th National Congress of Theoretical and Applied Mechanics*, Tokyo, Japan, August 22–24, 2017: "Redundancy, robustness, and resilience of structures."

▶ **Member**, Subcommittee on design science in computational intelligence and architecture,
Architectural Institute of Japan. Apr/2017 - Mar/2023

▶ **Executive secretary**, Subcommittee of structural system with high resilience,

Architectural Institute of Japan. Apr/2017 - Mar/2021

▸ **Member**, Subcommittee of structural optimization and design,
Architectural Institute of Japan. Apr/2016 - Mar/2020

▸ **Member**, International scientific committee,
The 5th International Conference on Engineering Optimization (EngOpt 2016), Iguassu Falls, Brazil, July 19–23, 2016.

▸ **Chief**, Scientific committee,
Member, Local organizing committee,
Asian Congress of Structural and Multidisciplinary Optimization 2016 (ACSMO 2016), Nagasaki, Japan, May 22–26, 2016.

▸ **Organized a session** (with Izuru Takewaki and Makoto Yamakawa) at *the 63rd National Congress of Theoretical and Applied Mechanics*, Tokyo, Japan, September 26–28, 2016: "Robust optimal design of structures."

▸ **Member**, Scientific committee,
The 8th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM8), Gyeongju, Korea, May 25–29, 2014.

▸ **Member**, 多目的最適設計・満足化設計に関する研究分科会, Apr/2013 - present
NPO しなやかシステム工学研究所.
Director Apr/2017 - present

▸ **Member**, Subcommittee of resilience evaluation of structures,
Architectural Institute of Japan. Apr/2013 - Mar/2017

▸ **Member**, Subcommittee of theory and applications of strongly nonlinear problems,
Architectural Institute of Japan. Apr/2013 - Mar/2018

▸ **Member**, Organizing committee,
2013 Spring Meeting of the Operations Research Society of Japan, Tokyo, Japan, March 5–6, 2013.

▸ **Remote reviewer**,
FCT Grants for Research Projects 2012,
Fundação para a Ciência e Tecnologia (FCT, Portuguese Foundation for Science and Technology).

▸ **Member**, International scientific committee,
The 3rd International Conference on Engineering Optimization (EngOpt 2012), Rio de Janeiro, Brazil, July 1–5, 2012.

▸ **Member**, Local organizing committee,
The 9th World Congress of Structural and Multidisciplinary Optimization (WCSMO9), Shizuoka, Japan, June 13–17, 2011.

▸ **Organized a session** (with Izuru Takewaki) at *the 60th National Congress of Theoretical and Applied Mechanics*, Tokyo, Japan, March 8–10, 2011: "Redundancy and performance of structures."

▸ **Member**, Local organizing committee,
The 6th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM6), Kyoto, Japan, June 22–25, 2010.

▸ **Member**, International scientific committee,
The 4th International Workshop on Reliable Engineering Computing (REC2010): Robust Design—Coping with Hazards, Risk and Uncertainty, Singapore, March 3–5, 2010.

▸ **Organized a session** (with Izuru Takewaki) at *the 58th National Congress of Theoretical and Applied Mechanics*, Tokyo, Japan, June 9–11, 2009: "Robust and optimal design of structures."

▸ **Member**, Subcommittee of redundancy and performance optimization in structural design,
Architectural Institute of Japan. Apr/2009 - Mar/2013

▸ **Member**, Subcommittee of strongly nonlinear problems and predictability,
Architectural Institute of Japan. Apr/2009 - Mar/2013

▸ **Organized a session** (with Izuru Takewaki) at *the 57th National Congress of Theoretical and Applied Mechanics*, Tokyo, Japan, June 10–12, 2008: "Robust and optimal design of structures."

▸ **Member**, Subcommittee of structural performance optimization and robustness,
Architectural Institute of Japan. Apr/2007 - Mar/2009

▸ **Member**, Subcommittee on highly nonlinear problems of building structures,
Architectural Institute of Japan. Apr/2005 - Mar/2009

PROFESSIONAL SOCIETY MEMBERSHIPS

▶ Architectural Institute of Japan (AIJ)   2004 - present
▶ Asian Society of Structural and Multidisciplinary Optimization (ASSMO)   2014 - present
▶ International Association for Computational Mechanics (IACM)   2011 - 2021
▶ International Society for Structural and Multidisciplinary Optimization (ISSMO) 2002 - present
▶ Japan Society for Computational Engineering and Science (JSCES)   2011 - 2021
▶ Japan Society for Industrial and Applied Mathematics (JSIAM)   2016 - present
▶ Japan Society of Mechanical Engineers (JSME)   2007 - present
▶ Operations Research Society of Japan (ORSJ)   2008 - present

MEMBERSHIP OF EDITORIAL BOARDS

▶ Numerical Algebra, Control and Optimization   Jan/2021 - Dec/2022
▶ Transactions of Architectural Institute of Japan   June/2020 - May/2022

JOURNAL REFEREE

▶ AIJ Journal of Technology and Design
▶ Applied Physics Express
▶ Computational Mechanics
▶ Computer Methods in Applied Mechanics and Engineering
▶ Earthquake Engineering and Structural Dynamics
▶ European Journal of Operational Research
▶ IEEE Transactions on Cybernetics
▶ International Journal for Numerical Methods in Engineering
▶ International Journal of Non-Linear Mechanics
▶ International Journal of Solids and Structures
▶ Journal of Computational and Applied Mathematics
▶ Journal of Structural and Construction Engineering (Transactions of AIJ)
▶ Journal of Structural Engineering (ASCE)
▶ Journal of the Mechanics and Physics of Solids
▶ Journal of the Operations Research Society of Japan
▶ Journal of Theoretical, Computational and Applied Mechanics
▶ Mathematical Methods of Operations Research
▶ Optimization and Engineering
▶ Proceedings A (the Royal Society of London, Mathematical and Physical Sciences)
▶ Risk Analysis
▶ SIAM Journal on Optimization
▶ Structural and Multidisciplinary Optimization
▶ Structural Engineering and Mechanics
▶ Structural Safety
▶ Transactions of the Japan Society for Industrial and Applied Mathematics
▶ Transactions of the Japan Society of Mechanical Engineers (JSME)

TEACHING EXPERIENCES[†]

The University of Tokyo
▶ Mathematical Method III (undergraduate course on optimization)   Sep/2018 - present
▶ Linear Algebra and Analysis for Students of Humanities and Social Sciences Major I & II (undergraduate courses)

Apr/2025 - present

[†]See also "SOCIAL ACTIVITIES" section.

▸ Advanced Core in Linear Algebra (graduate course)

Apr/2009 - Aug/2010, Apr/2015 - Aug/2015, Apr/2018 - Aug/2019

▸ Optimization Methods (undergraduate course)   Oct/2007 - Mar/2017

▸ Applied Mathematics in Engineering (graduate course)   Apr/2007 - Mar/2016

Tokyo Institute of Technology

▸ Mathematical Design of Structures (graduate course)   Apr/2016 - Sep/2017

Kyoto University

▸ Experiments in Physics   Apr/2005 - Mar/2006

SCHOLARSHIPS

▸ **Research Fellow (pre-doctoral fellow)**, ¥6,150,000,   Apr/2000 - Sep/2002
Japan Society for the Promotion of Sciences.

CONFERENCE PRESENTATIONS

▸ **Keynote and Plenary Lectures**

[3] **Y. Kanno**: "Reliability- and robustness-based design." *State-Of-The-Art (SOTA) Panel Session, the 13th World Congress of Structural and Multidisciplinary Optimization (WCSMO13)*, Beijing, China, May 20–24, 2019.

[2] **Y. Kanno**: トラスのロバスト最適設計. 第 24 回信頼性設計技術 WS & 第 37 回最適設計研究会, Yokohama, November 24–26, 2017.

[1] **Y. Kanno**: "Mixed-integer programming approaches to topology optimization of finite-dimensional structures." *Keynote lecture* at *the Asian Congress of Structural and Multidisciplinary Optimization 2016 (AC-SMO 2016)*, paper #8, Nagasaki, Japan, May 22–26, 2016.

▸ **Invited Talks**

[9] **Y. Kanno**: "Accelerated gradient methods in applied mechanics (in Japanese)." *The 36th RAMP symposium*, the Operations Research Society of Japan, Himeji, Japan, November 18–19, 2024.

[8] 寒野 善博：凸最適化における双対性とその応用. 日本応用数理学会「数理設計」研究部会 第 22 回研究集会, Online (Nagoya, Japan), December 18, 2020.

[7] 寒野 善博：固有値の最適化と構造力学. 大崎純教授還暦記念ワークショップ『建築力学と数理』, Online (Kyoto, Japan), October 24, 2020.

[6] **Y. Kanno**: "Optimal design of truss structures by using mixed-integer second-order cone programming (in Japanese)." *The 27th RAMP symposium*, the Operations Research Society of Japan, Hamamatsu, Japan, October 15–16, 2015.

[5] **Y. Kanno**: "Design of periodic frame structures with negative thermal expansion via mixed integer programming." *The 3rd International Workshops on Advances in Computational Mechanics (IWACOM III)*, Tokyo, Japan, October 12–14, 2015.

[4] 寒野 善博：構造物の対称性と最適化の数理. 室田一雄教授還暦記念シンポジウム『数理工学の伝統と潮流』, Tokyo, Japan, April 11, 2015.

[3] **Y. Kanno**: "Robust optimization of structures (in Japanese)." *The 66th Symposium*, the Operations Research Society of Japan, Kobe, Japan, September 17, 2011.

[2] **Y. Kanno**, I. Takewaki: "Uncertainty analysis of structures via semidefinite program (in Japanese)." *The 19th RAMP symposium*, the Operations Research Society of Japan, Nagasaki, Japan, October 25–26, 2007.

[1] **Y. Kanno**, I. Takewaki: "Info-gap theory in analysis of robustness of civil structures against model error and load uncertainty." *Workshop on Info-Gap Analysis of Engineering Systems: Robust Decisions under Severe Uncertainty*, Newcastle-upon-Tyne, UK, September 29–30, 2005.

▶ **International Conferences**

[??] T. Asanuma, **Y. Kanno**: Multi-objective multimodal surrogate optimization of mixed-variable motor design problem. *The 16th World Congress of Structural and Multidisciplinary Optimization (WCSMO16)*, paper #??, Kobe, Japan, May 18–23, 2025.

[??] T. Fujiyama, **Y. Kanno**: "Second-order cone programming formulation for distributionally robust optimization of truss compliance under uncertainty in distribution of external load." *The 16th World Congress of Structural and Multidisciplinary Optimization (WCSMO16)*, paper #??, Kobe, Japan, May 18–23, 2025.

[??] **Y. Kanno**: "Reliability-based truss topology optimization with uncertain expected value of external load via semidefinite programming." *The 16th World Congress of Structural and Multidisciplinary Optimization (WCSMO16)*, paper #??, Kobe, Japan, May 18–23, 2025.

[90] **Y. Kanno**: Confidence-based data-driven computing in elasticity by using segmented least squares and mixed-integer programming. *The 7th International Conference on Materials and Reliability (ICMR-2024)*, paper #P00029, Busan, Korea, December 3–6, 2024.

[89] A. Nishioka, **Y. Kanno**: Epi-convergent approximations of discontinuous generalized eigenvalue functions with application to topology optimization. *The 25th International Symposium on Mathematical Programming (ISMP 2024)*, Montréal, Canada, July 21–26, 2024.

[88] T. Asanuma, **Y. Kanno**: Mixed-variable IPM motor design optimization using an RBF surrogate model. *Asian Congress of Structural and Multidisciplinary Optimization 2024 (ACSMO 2024)*, paper #D20317, Zhengzhou, China, May 19–23, 2024.

[87] A. Nishioka, **Y. Kanno**: Approximations of unbounded and discontinuous generalized eigenvalue functions in topology optimization. *Asian Congress of Structural and Multidisciplinary Optimization 2024 (ACSMO 2024)*, paper #A10261, Zhengzhou, China, May 19–23, 2024.

[86] **Y. Kanno**: Confidence-based non-parametric reliability optimization of trusses based on data-driven approach to computational elasticity. *Asian Congress of Structural and Multidisciplinary Optimization 2024 (ACSMO 2024)*, paper #C20300, Zhengzhou, China, May 19–23, 2024.

[85] A. Nishioka, M. Toyoda, M. Tanaka, **Y. Kanno**: "A first-order method for large-scale eigenvalue optimization problems in topology optimization." *The 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023)*, paper #3876, Tokyo, Japan, August 20–25, 2023.

[84] A. Nishioka, M. Toyoda, M. Tanaka, **Y. Kanno**: "Smoothing methods for some eigenvalue optimization problems in topology optimization." *The 15th World Congress of Structural and Multidisciplinary Optimization (WCSMO15)*, paper #169, Cork, Ireland, June 5–9, 2023.

[83] **Y. Kanno**: "Reliability-based structural optimization under uncertainty in expected value of external load." *The 15th World Congress of Structural and Multidisciplinary Optimization (WCSMO15)*, paper #115, Cork, Ireland, June 5–9, 2023.

[82] A. Nishioka, **Y. Kanno**: "Accelerated projected gradient method for topology optimization of heat conduction problem." Joint Organization of *the 15th World Congress on Computational Mechanics (WCCM XV)* and *the 8th Asian Pacific Congress on Computational Mechanics (APCOM VIII)*, paper #467, Online (Yokohama, Japan), July 31–August 5, 2022.

[81] **Y. Kanno**: "First-order primal-dual algorithm for quasi-static unilateral contact problem with Coulomb friction." Joint Organization of *the 15th World Congress on Computational Mechanics (WCCM XV)* and *the 8th Asian Pacific Congress on Computational Mechanics (APCOM VIII)*, paper #381, Online (Yokohama, Japan), July 31–August 5, 2022.

[80] A. Nishioka, **Y. Kanno**: Smoothing method for worst-case topology optimization under load uncertainty. *Asian Congress of Structural and Multidisciplinary Optimization 2022 (ACSMO 2022)*, paper #2C1-3, Matsue (hybrid format), Japan, May 22–26, 2022.

[79] **Y. Kanno**: On reliability constraint when design variables follow multivariate normal distribution with uncertain mean vector and variance-covariance matrix. *Asian Congress of Structural and Multidisciplinary Optimization 2022 (ACSMO 2022)*, paper #2E4-2, Matsue (hybrid format), Japan, May 22–26, 2022.

[78] **Y. Kanno**: "Data-driven reliability-based design optimization with dimensionality reduction." *The 25th International Congress of Theoretical and Applied Mechanics (25th ICTAM)*, Online (Milano, Italy), August 22–27, 2021.

[77] A. Nishioka, **Y. Kanno**: "Accelerated projected gradient method for compliance minimization problem." *The 14th World Congress of Structural and Multidisciplinary Optimization (WCSMO14)*, paper #89, Online (Boulder, Colorado), June 13–18, 2021.

[76] **Y. Kanno**: "Robust optimization of structures under unilateral contacts with uncertain initial gaps." *The 14th World Congress of Structural and Multidisciplinary Optimization (WCSMO14)*, paper #25, Online (Boulder, Colorado), June 13–18, 2021.

[75] **Y. Kanno**: "Extracting constitutive manifold for computational elasticity: a kernel-based method." Joint Organization of *the 14th World Congress on Computational Mechanics (WCCM XIV)* and *the 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2020)*, paper #2932, Online (Paris, France), January 11–15, 2021.

[74] **Y. Kanno**: "Topology optimization of structures under frictionless unilateral contact: a formulation without complementarity constraints." *Asian Congress of Structural and Multidisciplinary Optimization 2020 (ACSMO 2020)*, paper #P00013, Online (Seoul, Korea), November 23–25, 2020.

[73] **Y. Kanno**, M. Ohsaki, J. K. Guest: "Unified treatment of some different fabrication-cost functions in truss topology optimization." Joint Organization of *International Association for Shell and Spatial Structures (IASS) Annual Symposium 2019* and *Structural Membranes 2019—Form and Force*, paper #166, Barcelona, Spain, October 7–10 (2019).

[72] **Y. Kanno**: "Accelerated proximal gradient methods for incremental problems in plasticity." *The 8th Symposium of the European Network for Nonsmooth Dynamics (ENNSD8)*, Montbonnot, France, September 17–18, 2019.

[71] W. Shimizu, **Y. Kanno**: "Accelerated proximal gradient methods for quasistatic analysis of elastoplastic continua." *The 30th European Conference on Operational Research (EURO 2019)*, Dublin, Ireland, June 23–26, 2019.

[70] **Y. Kanno**: "Bridging reliability-based design optimization and robust design optimization: a data-driven approach." *The 13th World Congress of Structural and Multidisciplinary Optimization (WCSMO13)*, paper #A210298, Beijing, China, May 20–24, 2019.

[69] R. Watada, M. Ohsaki, **Y. Kanno**: "Group theoretic approach to detecting finite mechanisms of bar-hinge models of retractable structures." *The 12th Asian–Pacific Conference on Shell and Spatial Structures (APCS 2018)*, pp. 165–173, Penang, Malaysia, October 29–31, 2018.

[68] S. Fujita, **Y. Kanno**: "Global topology optimization of structural frames considering constructability." *International Association for Shell and Spatial Structures (IASS) Annual Symposium—Creativity in Structural Design*, paper #267, Boston, Massachusetts, July 16–20, 2018.

[67] **Y. Kanno**: "An accelerated Uzawa method for frictionless contact problems." *The 10th European Solid Mechanics Conference (ESMC 2018)*, paper #199, Bologna, Italy, July 2–6, 2018.

[66] **Y. Kanno**, S. Kitayama: "A simple heuristic based on alternating direction method of multipliers for solving mixed-integer nonlinear optimization." *Asian Congress of Structural and Multidisciplinary Optimization 2018 (ACSMO 2018)*, paper #A010010, Dalian, China, May 21–24, 2018.

[65] **Y. Kanno**: "Mixed-integer second-order cone programming for truss topology optimization with self-weight load and limitation on number of nodes." *IEEE International Conference on Industrial Engineering and Engineering Management (IEEE IEEM2017)*, pp. 1009–1012, Singapore, December 10–13, 2017.
DOI: 10.1109/IEEM.2017.8290044

[64] S. Fujita, **Y. Kanno**: "Optimization of shape and thickness of continuum shell structures using 2D and 3D shell elements." *International Association for Shell and Spatial Structures (IASS) Annual Symposium—Interfaces: Architecture, Engineering, Science*, paper #9517, Hamburg, Germany, September 25–28, 2017.

[63] **Y. Kanno**, S. Fujita: "A heuristic for truss topology optimization under constraint on number of nodes." *International Association for Shell and Spatial Structures (IASS) Annual Symposium—Interfaces: Architecture, Engineering, Science*, paper #9455, Hamburg, Germany, September 25–28, 2017.

[62] W. Shimizu, **Y. Kanno**: "A fast first-order optimization approach to quasistatic elastoplastic analysis with von Mises yield criterion." *XIV International Conference on Computational Plasticity (COMPLAS 2017)*, paper #12, Barcelona, Spain, September 5–7, 2017.

[61] S. Fujita, **Y. Kanno**, M. Ohsaki: "Optimization method for creating minimal surface discretized by parametric surface." *The 12th World Congress of Structural and Multidisciplinary Optimization (WCSMO12)*, paper #52, Braunschweig, Germany, June 5–9, 2017.

[60] K. Yonekura, **Y. Kanno**: "A fast heuristic method using Hessian matrix for fluid topology optimization." *The 12th World Congress of Structural and Multidisciplinary Optimization (WCSMO12)*, paper #159, Braunschweig, Germany, June 5–9, 2017.

[59] **Y. Kanno**: "Robust truss topology optimization under uncertain loads by using penalty concave-convex procedure." *The 12th World Congress of Structural and Multidisciplinary Optimization (WCSMO12)*, paper #14, Braunschweig, Germany, June 5–9, 2017.

[58] **Y. Kanno**: "Accelerated proximal gradient method for equilibrium analysis of elastoplastic spatial truss structures." *International Association for Shell and Spatial Structures (IASS) Annual Symposium—Spatial Structures in the 21st Century*, paper #1038, Tokyo, Japan, September 26–30, 2016.

[57] **Y. Kanno**: "Redundancy optimization of trusses against uncertainty in structural damage." *EUROMECH Colloquium 584, Multi-Uncertainty and Multi-Scale Methods and Related Applications*, Porto, Portugal, September 14–16, 2016.

[56] T. Yamaguchi, **Y. Kanno**: "A semidefinite programming approach to static shakedown analysis with von Mises yield criterion and ellipsoidal load domain." *Emerging Trends in Applied Mathematics and Mechanics (ETAMM 2016)*, Perpignan, France, May 30–June 3, 2016.

[55] K. Yonekura, **Y. Kanno**: "A study of topology optimization of a flow field with time-periodic boundary conditions using the lattice Boltzmann method." *The Asian Congress of Structural and Multidisciplinary Optimization 2016 (ACSMO 2016)*, paper #108, Nagasaki, Japan, May 22–26, 2016. Kazuo Yonekura received the **ACSMO Young Scientist Award**.

[54] Y. Yamaoka, M. Ohsaki, **Y. Kanno**: "Optimization approach to design of linkage mechanisms with arbitrarily inclined hinges." *The Asian Congress of Structural and Multidisciplinary Optimization 2016 (ACSMO 2016)*, paper #14, Nagasaki, Japan, May 22–26, 2016.

[53] **Y. Kanno**: "On multiplicity of eigenvalues in robust compliance optimization under uncertain loads." *The 3rd International Conference on Materials and Reliability (ICMR-2015)*, paper #140073, Jeju Island, Korea, November 23–25, 2015.

[52] K. Yonekura, **Y. Kanno**: "A topology optimization method for a flow field using the lattice Boltzmann method considering wall boundary conditions." *The 11th World Congress of Structural and Multidisciplinary Optimization (WCSMO11)*, paper #1276, Sydney, Australia, June 7–12, 2015.

[51] **Y. Kanno**: "Truss topology optimization under constraints on number of different design variables." *The 11th World Congress of Structural and Multidisciplinary Optimization (WCSMO11)*, paper #1044, Sydney, Australia, June 7–12, 2015.

[50] M. Hirota, **Y. Kanno**: "A mixed-integer programming approach to design of periodic structures with negative thermal expansion." *The 4th International Conference on Engineering Optimization (EngOpt 2014)*, paper #5780, Lisbon, Portugal, September 8–11, 2014.

[49] K. Yonekura, **Y. Kanno**: "Topology optimization method for three-dimensional flow field using transient information of lattice Boltzmann method." Joint Organization of *the 11th World Congress on Computational Mechanics (WCCM XI)*, *the 5th European Conference on Computational Mechanics (ECCM V)*, and *the 6th European Conference on Computational Fluid Dynamics (ECFD VI)*, Barcelona, Spain, July 20–25, 2014.

[48] R. Kureta, **Y. Kanno**: "Exploring frame structures with negative Poisson's ratio via mixed integer programming." Joint Organization of *the 11th World Congress on Computational Mechanics (WCCM XI)*, *the 5th European Conference on Computational Mechanics (ECCM V)*, and *the 6th European Conference on Computational Fluid Dynamics (ECFD VI)*, paper #572, Barcelona, Spain, July 20–25, 2014.

[47] K. Yonekura, **Y. Kanno**: "PDE formulation of topology optimization method for flow field." *International Conference on Engineering and Applied Sciences Optimization (OPT-i)*, paper #3388, Kos Island, Greece, June 4–6, 2014.

[46] M. Ohsaki, **Y. Kanno**, S. Tsuda: Linear programming approach to design of spatial link mechanisms. *The 8th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM8)*, paper #52, Gyeongju, Korea, May 25–29, 2014.

[45] D. Hashimoto, **Y. Kanno**: "Robust truss topology optimization under geometric uncertainties via semidefinite programming." *The 8th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM8)*, paper #49, Gyeongju, Korea, May 25–29, 2014.

[44] **Y. Kanno**: "Generating asymmetric tensegrity structures via truss topology optimization." *International Association for Shell and Spatial Structures (IASS) Annual Symposium—Beyond the Limits of Man*, paper #1133, Wroclaw, Poland, September 23–27, 2013.

[43] S. Tsuda, M. Ohsaki, **Y. Kanno**: "Analysis and design of deployable frames with partially rigid connections." *International Association for Shell and Spatial Structures (IASS) Annual Symposium—Beyond the Limits of Man*, paper #1206, Wroclaw, Poland, September 23–27, 2013.

[42] **Y. Kanno**: "Discrete optimization of damper placement in a shear building via mixed integer programming." *International Conference on Vibration Problems (ICOVP 2013)*, paper #489, Lisbon, Portugal, September 9–12, 2013.

[41] M. Ohsaki, **Y. Kanno**, S. Tsuda: "Linear programming approach to design of link mechanisms of partially rigid frames." *The 10th World Congress of Structural and Multidisciplinary Optimization (WCSMO10)*, paper #5137, Florida, USA, May 19–24, 2013.

[40] **Y. Kanno**, M. Ohsaki: "Warm-start strategy in implicit reformulation method for frictionless contact problems." *The 8th European Solid Mechanics Conference (ESMC 2012)*, Graz, Austria, July 9–13, 2012.

[39] **Y. Kanno**: "Design of tensegrity structures by using mixed integer programming." *The 7th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM7)*, paper #J059, Huangshan, China, June 18–21, 2012.

[38] **Y. Kanno**: "Worst-scenario of deficiency of structural elements in plastic limit analysis." *Asian–Pacific Symposium on Structural Reliability and its Applications (APSSRA 2012)*, Singapore, May 23–25, 2012.

[37] **Y. Kanno**: "Topology optimization of tensegrity structures based on nonsmooth mechanics." *The 5th International Conference on Advanced Computational Methods in Engineering (ACOMEN 2011)*, Liège, Belgium, November 14–17, 2011.

[36] **Y. Kanno**: "Topology optimization of tensegrity structures via mixed integer programming." *The 9th World Congress of Structural and Multidisciplinary Optimization (WCSMO9)*, paper #283, Shizuoka, Japan, June 13–17, 2011.

[35] **Y. Kanno**: "An implicit smooth reformulation of complementarity constraints for application to robust structural optimization." *The 2nd International Conference on Engineering Optimization (EngOpt 2010)*, paper #1159, Lisbon, Portugal, September 6–9, 2010.

[34] K. Yonekura, **Y. Kanno**: "Second-order cone programming formulation for quasi-static analysis of elasto-plastic structures." *The 9th World Congress on Computational Mechanics* and *the 4th Asian–Pacific Congress on Computational Mechanics (WCCM/APCOM 2010)*, Sydney, Australia, July 19–23, 2010.

[33] R. Watada, M. Ohsaki, **Y. Kanno**: "Uniqueness and symmetry of optimal thickness distribution of axisymmetric shells." *The 6th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM6)*, paper #J28, Kyoto, Japan, June 22–25, 2010.

[32] **Y. Kanno**, X. Guo: "Robust truss topology optimization with discrete design variables via mixed integer programming." *The 6th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM6)*, paper #J10, Kyoto, Japan, June 22–25, 2010.

[31] R. Fujita, **Y. Kanno**: "A numerical algorithm for enumerating all wedged configurations in contact problem with Coulomb friction." *The 4th European Conference on Computational Mechanics (ECCM IV)*, paper #733, Paris, France, May 16–21, 2010.

[30] S. Ehara, **Y. Kanno**: "Mixed integer programming for finding tensegrity structures." *International Conference on Computational Design in Engineering (CODE2009)*, Seoul, Korea, November 3–6, 2009.

[29] **Y. Kanno**, I. Takewaki: "Semidefinite program for response bound analysis of structures subjected to uncertain harmonic dynamic loads." *The 9th Japan–Korea Design Engineering Workshop (DEWS2009)*, Yomitan-son, Japan, October 26–27, 2009.

[28] Y. Fujii, **Y. Kanno**: "Wrinkling analysis of orthotropic membranes via semidefinite programming." *International Association for Shell and Spatial Structures (IASS) 50th Anniversary Symposium—Evolution and Trends in Design, Analysis and Construction of Shell and Spatial Structures*, Valencia, Spain, September 28–October 2, 2009.

[27] S. Ehara, **Y. Kanno**: "A mixed 0–1 programming approach to topology-finding of tensegrity structures." *International Association for Shell and Spatial Structures (IASS) 50th Anniversary Symposium—Evolution and Trends in Design, Analysis and Construction of Shell and Spatial Structures*, Valencia, Spain, September 28–October 2, 2009.

[26] **Y. Kanno**, I. Takewaki: "Semidefinite programming for robustness analysis of structures under large uncertainties." *The 10th International Conference on Structural Safety and Reliability (ICOSSAR2009)*, Osaka, Japan, September 13–17, 2009.

[25] **Y. Kanno**, I. Takewaki: "Dynamic steady-state analysis of structures under uncertain harmonic loads via semidefinite program." *IUTAM Symposium on the Vibration Analysis of Structures with Uncertainties*, Saint Petersburg, Russia, July 6–9, 2009.

[24] K. Yonekura, **Y. Kanno**: "Global optimization of robust truss topology via mixed 0–1 semidefinite programming." *The 8th World Congress of Structural and Multidisciplinary Optimization (WCSMO8)*, Lisbon, Portugal, June 1–5, 2009.

[23] **Y. Kanno**, M. Ohsaki: "A sequential second-order cone programming for stability analysis of nonsmooth mechanical systems." *The 8th World Congress of Structural and Multidisciplinary Optimization (WCSMO8)*, paper #1066, Lisbon, Portugal, June 1–5, 2009.

[22] T. Miyamura, **Y. Kanno**, M. Ohsaki: "Combination of interior-point method and semismooth Newton method for large-scale frictionless contact problems." Joint Organization of *the 8th World Congress on Computational Mechanics (WCCM8)* and *the 5th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008)*, Venice, Italy, June 30–July 4, 2008.

[21] **Y. Kanno**, K. Murota, M. Kojima, S. Kojima: "Block-diagonal decomposition of matrices based on ∗-algebra for structural optimization with symmetry property." *The 5th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM5)*, Jeju Island, Korea, June 16–19, 2008.

[20] **Y. Kanno**, I. Takewaki: "Ellipsoidal bounds for uncertainty analysis of structures by using semidefinite programming." *The 7th International Conference on Optimization: Techniques and Applications (ICOTA7)*, Kobe, Japan, December 12–15, 2007.

[19] T. Miyamura, **Y. Kanno**, M. Ohsaki: "Combination of interior-point method and semismooth Newton method for solving frictionless contact problems." *The 3rd Asian–Pacific Congress on Computational Mechanics (APCOM'07)*, Kyoto, Japan, December 3–6, 2007.

[18] **Y. Kanno**, I. Takewaki: "Confidence bounds for static response of braced frames with structural and load uncertainties." *The 3rd Asian–Pacific Congress on Computational Mechanics (APCOM'07)*, Kyoto, Japan, December 3–6, 2007.

[17] **Y. Kanno**, M. Ohsaki: "Maximization of minimal eigenvalue of structures by using sequential semidefinite programming." *The 7th World Congress of Structural and Multidisciplinary Optimization (WCSMO7)*, pp. 1121–1130, Seoul, Korea, May 21–25, 2007.

[16] **Y. Kanno**, I. Takewaki: "Global optimization algorithm for worst-case limit analysis of trusses under load uncertainties." *The 4th International Conference on Computational Methods (ICCM 2007)*, Hiroshima, Japan, April 4–6, 2007.

[15] **Y. Kanno**, I. Takewaki: "Ellipsoidal bounds for static response of uncertain trusses by using semidefinite programming." *The 4th China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM4)*, Kunming, China, November 6–9, 2006.

Awarded **the ACSMO Young Scientist Award**.

[14] **Y. Kanno**, J. A. C. Martins: "Arc-length method for frictional contact with a criterion of maximum dissipation of energy." *The 3rd European Conference on Computational Mechanics (ECCM-2006)*, Lisbon, Portugal, June 5–8, 2006.

[13] **Y. Kanno**, I. Takewaki: "Evaluation and maximization of robustness of trusses by using semidefinite programming." *The 6th World Congress of Structural and Multidisciplinary Optimization (WCSMO6)*, Rio de Janeiro, Brazil, May 30–June 3, 2005.

[12] **Y. Kanno**, J. A. C. Martins: "Arc-length method for frictional contact based on mathematical program with complementarity constraints." *The 3rd China–Japan–Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJK-OSM3)*, Kanazawa, Japan, October 30–November 2, 2004.

[11] **Y. Kanno**, A. Pinto da Costa, J. A. C. Martins: "Second-order cone complementarity formulation for quasi-static incremental frictional contact problem in three-dimensional space." *The 21st International Congress of Theoretical and Applied Mechanics (21st ICTAM)*, Warsaw, Poland, August 15–21, 2004.

[10] **Y. Kanno**, J. A. C. Martins, A. Pinto da Costa: "Second-order cone linear complementarity formulation of quasi-static incremental frictional contact problem." *The 4th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2004)*, Jyväskylä, Finland, July 24–28, 2004.

[9] M. Ohsaki, **Y. Kanno**: "Form-finding of cable domes with specified stresses by using nonlinear programming." *International Symposium on New Perspectives for Shell and Spatial Structures (IASS-APCS 2003)*, Taipei, Taiwan, October 22–25, 2003.

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